

Department of the Interior:

U. S. NATIONAL MUSEUM.

— 5 —

BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

NO. 5.—CATALOGUE OF THE FISHES OF THE BERMUDAS.

BY

G. BROWN GOODE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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PUBLISHED UNDER THE DIRECTION OF THE SMITHSONIAN INSTITUTION.

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ADVERTISEMENT.

This work is the fifth of a series of papers intended to illustrate the collections of Natural History and Ethnology belonging to the United States and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

JOSEPH HENRY,

Secretary Smithsonian Institution.

SMITHSONIAN INSTITUTION,

Washington, November, 1875.

CATALOGUE

OF THE

FISHES OF THE BERMUDAS.

BASED CHIEFLY UPON THE COLLECTIONS OF THE UNITED
STATES NATIONAL MUSEUM.

By G. BROWN GOODE, M. A.

ASSISTANT CURATOR U. S. NATIONAL MUSEUM.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1876.

ATLANTA

MEMBERS OF THE BOARD

THE ATLANTA BOARD

MEMBERS OF THE BOARD

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INTRODUCTORY REMARKS.

A visit to the Bermudas during the months of February and March, 1872, afforded opportunities for collecting the notes and specimens upon which the present paper is based. The enumeration of species here attempted, although necessarily far from exhaustive, is believed to indicate, with some degree of accuracy, the character of the ichthyological fauna of the group; and it is hoped that this list, with its annotations, may not be without interest as a contribution to geographical zoology. Surprisingly little has been done by naturalists in the investigation of the marine life of this region, interesting as it is likely to prove on account of its isolated, mid-atlantic position, the peculiarities of its climate, and its proximity to the Gulf Stream, rendering so easy observations upon the influence of ocean-currents in the distribution of living forms. The ichthyologist finds here the best of opportunities for the study of pelagic and migratory species. A broad field lies before some resident naturalist who will do for the ichthyology of the Bermudas what Poey and Bleeker have done and are doing for that of the East and West Indies. Comparatively little could be done in two months, least of all in winter and early spring, when stormy weather rendered explorations of the reefs impracticable, and often prevented the fishermen from leaving their moorings in the harbors. At the time of my visit, only seven species of fishes had been recorded from this locality; and the only authentic information regarding the fish-fauna was contained in one chapter, which was unfortunately very short, of Mr. Jones's admirable little work,* the author at that time not having turned his attention to the study of this class. The list given by Godet† should

* *The Naturalist in Bermuda*; a sketch of the geology, zoology, and botany of that remarkable group of islands; together with meteorological observations. By John Matthew Jones, esq. (of the Middle Temple), assisted by Maj. J. W. Wedderburn (late 42nd Roy. Highlanders) and J. L. Hurdis, esq.—With a map and illustrations.—“Every kingdom, every province, should have its own monographer.”—Gilbert White. London: Reeve & Turner, 238, Strand.—1859. 12mo, pp. xii, 200.

† *Bermuda, its History, Geology, Climate, Products, Agriculture, Commerce, and Government*. By T. L. Godet. London, 1860. 12mo.

be ignored, as it is taken almost bodily from Gosse's "Naturalist in Jamaica."

In the present list, I enumerate seventy-five species, most of which were personally observed; for convenience of reference, all species known to occur in this locality have been included. In working up my notes, I have endeavored to supplement previous descriptions by (1) descriptions of the colors of the fishes *while living*, (2) notes on size and proportions, (3) observations on habits, (4) hints in reference to the origin and meaning of their popular names, (5) notes upon modes of capture and economic value. The meaning of the specific names employed has been defined by partial synonymies, to which critical notes are occasionally appended. To make the list a more complete contribution to chorological knowledge, a brief note has been given upon the geographical distribution of each species.

The scheme of classification proposed by Professor Gill* has been followed throughout. I am indebted to Professor Gill for valuable suggestions and the identification of two or three of the more doubtful species.

TOPOGRAPHY OF THE ISLANDS.

The general topography of the Bermudas is so well known that no detailed account will be necessary. It may not be out of place, how-

* Arrangement of the Families of Fishes or Classes Pisces, Marsipobranchii, and Leptocardii. Prepared for the Smithsonian Institution by Theodore Gill, M. D., Ph. D. Washington: published by the Smithsonian Institution, November, 1872. 8vo, pp. xlvii, 50. (Smithsonian Miscellaneous Collections, 247.)

Catalogue of the Fishes of the East Coast of North America, by Theodore Gill. < Report on the Condition of the Sea Fisheries of the South Coast of New England in 1871 and 1872, by Spencer F. Baird, Commissioner, &c. pp. 779-822.

Catalogue of the Fishes of the East Coast of North America, by Theodore Gill, M. D. Ph. D. Washington. Published by the Smithsonian Institution, 1873. 8vo, pp. 50. (Smithsonian Miscellaneous Collections, 283.—A reprint of the preceding).

On the Limits of the Class of Fishes. By Theodore Gill, M. D., Ph. D. < American Naturalist, vol. vii, pp. 71-77, February, 1873. (Reprinted with repagination, 8vo, pp. 9; no title-page.)

The Number of Classes of Vertebrates and their Mutual Relations, By Prof. Theodore Gill. (Abstract of a Communication to the National Academy of Sciences, made October 29, 1873.) < American Journal of Science and Arts, vi, December, 1873, pp. 432-436. Reprinted with repagination, 8vo, pp. 4; no title-page;) also reprinted Annals and Magazine of Natural History, (London,) xiii, pp. 71-73, Jan. 1874.

Article *Fish* and descriptions of the various families, prepared by Professor Gill, as associate editor in the department of zoology, &c. < Johnson's New Universal Cyclopædia and Popular Treasury of Useful Knowledge. * * * A. J. Johnson & Son, New York.

ever, to refer to those features which bear more particularly upon the homes of the fishes. The sunken atoll, which is the foundation of the group, is shaped like an ellipse, its major axis twenty-five miles in length, its minor axis thirteen. The major axis runs in a northeast and southwest direction, the chain of main islands lying on the southeast edge of the ellipse, and forming a nearly continuous line twenty-six miles long, the lower or western end curving, nearly in the shape of a shepherd's crook or a fish-hook, to the southernmost focus of the supposed curve. The main islands, five in number, are separated by narrow channels, fifteen or twenty feet in depth, and their shores are deeply indented by shallow bays and lagoons. The reef, which approaches within a few hundred yards of the shore of the main islands on the south, is distant on the north and northwest from five to nine miles; the intervening space is crossed and recrossed by submerged reefs and ledges of coral limestone, and dotted in the neighborhood of the main islands by smaller islands and emerging ledges to the number of three hundred or more. The harbors are not particularly calm, but there are many broad bays whose surface the severest storms scarcely ripple. Within the encircling reef the depth of water rarely exceeds twelve and fourteen fathoms, while beyond this reef the bottom rapidly slopes to the level of the Atlantic bottom. Twenty miles to the southwest by west are two or three ledges, to which the fishermen resort for line-fishing in fine weather.

FISHERIES AND FISH-MARKETS.

The Bermudian fisheries have always been famous. A large number of the poorer islanders, particularly the negroes, are professional fishermen, and are bold and skillful sailors, though their ambition only suffices to keep them at work when purse and larder show signs of exhaustion. Every cottage has its little garden, where bananas and sweet-potatoes grow for the trouble of planting, so that the fishermen are not entirely dependent upon their occupation for support, and the supply of fish often falls far short of the demand, and this is especially the case in the winter, when the landing of a boat is the signal for a general rush to the shore. The people of Bermuda, over twelve thousand in number, are dependent chiefly upon the fisheries for their animal food. Large shipments of cattle and sheep are received from the United States, but these are monopolized by the wealthier classes and by the garrison, so that their flesh rarely finds its way to the tables of the negroes, who number over seven thousand, or of the poorer white colonists, who constitute more than one-half of the remaining population.

The fishing-boats are built in the English style, drawing five or six feet of water, deep-keeled, sloop or schooner rigged, and usually provided with a large well in the hold, in which the fish are brought in alive.

The only market is the water's edge. In the large towns, Hamilton and St. George's, the quay is lined nearly every morning at sunrise by a long row of fish-boats. The fish swim in the wells until customers are found for them; when one is selected, it is taken up in a landing-net or by a gaff-hook, and quickly killed by thrusting a sharp awl into the base of the brain; it is then bled, skinned (rarely scaled), eviscerated, and delivered into the hands of the purchaser, a loop of palmetto fiber always being attached for convenience in carrying. At an early hour the fares are disposed of, and the boats are under weigh for the fishing-grounds. At almost any time, however, row-boats filled with small seined fish may be found at the quay. Those who live in the country-parishes watch the return of their neighbors' boats at night-fall, and thus secure their supplies of fish.

Fish from such a market cannot fail to be fresh, and the excellence of the Bermuda food-fishes is due to this, and to the fact that they are never allowed to die of suffocation in the air, but are killed quickly and bled. The Angel-fish (*Holacanthus ciliaris*) is perhaps the most highly esteemed; next in rank are the various species of *Pristipomatidæ*, *Serranidæ*, and *Sparidæ*, with the Hog-fish (*Lachnolæmus falcatus*). All others are regarded inferior in quality. The price of fish is fixed by law at fourpence a pound, an advance of one penny having been made within a few years.

Most of the line-fishing is done among the outer reefs or on the outer banks, twenty miles distant. The favorite baits are the flesh of the "Bermuda lobster" (*Palinurus americanus*) and the "Spanish lobster" (*Scyllarus æquinoxialis*), and that of some of the larger fishes, such as the "Mackerel" (*Orcynus alliteratus*), and the Morays (*Muraenidæ*). The Pilchard (*Harengula macrophthalma*), Skad (*Eucinostomus gula* and *E. Lefroyi*), and the Robin (*Decapterus punctatus*), are used as "full-baits," as are also the various kinds of "fry" (*Atherina* and *Engraulis* sp.). The "Scuttle," a large *Octopus*, very common on the reefs, is also frequently used, its toughness making it a very lasting bait. Many of the choicest and largest species, such as the *Pristipomatidæ*, *Serranidæ*, and *Scombridæ*, are taken exclusively with lines.

The *Sparidæ*, *Labridæ*, *Scaridæ*, the smaller *Serranidæ*, and many others, with great quantities of the large crustaceans so much in demand for bait, are captured in basket-work fish-pots constructed of split cane.

These are built on the same principle with the lobster-pots in use on the New England coast, but are very peculiar in shape. A fair idea of one of them may be gained by imagining two crockery-crates placed together, with the ends at an angle so as to form a very thick capital letter V, with arms about four feet square, the entrance being through a funnel-shaped aperture placed in the inner angle. Smaller and more portable pots, made after the same model in annealed wire, are also in use. Such pots are baited with fish or lobsters, and anchored in two or three fathoms of water.

Shallow seines, a hundred yards or so in length, are plied in the bays, and with them are taken vast numbers of the smaller school-fishes, such as *Sargus variegatus*, *Pimelepterus Boscii*, *Mugil liza*, *Eucinostomus gula*, *Eucinostomus Lefroyi*, *Hemirhamphus Pleii*, *Decapterus punctatus*, &c. These seines are usually tanned with the bark of the mangrove-tree, (*Rhizophora mangle*.)

Circular casting-nets, ten feet in diameter, are used with much dexterity in capturing small fish for bait.

The "grains," a heavy, two-pronged instrument, resembling an ordinary fish-spear or gig, is carried in every boat, and used in striking large fish. The skillful grainsman seldom misses his mark, and in these waters, clear as crystal, this instrument is effective at the depth of ten or twelve feet.

During the winter months, recourse is had to the fish-ponds, which are stocked with the surplus of the summer's catch. These are of simple construction, usually natural pools in the rocks, or protected coves, inclosed by loosely-laid stone walls. Hundreds, sometimes thousands, of large fishes are here stored up for seasons when the severity of the weather is such as to prevent the usual visits to the fishing-grounds. The largest of these, the "Devil's Hole," on Harrington Sound, is visited by almost all the strangers on the islands, a small fee being charged for the privilege of seeing the fishes feed. Several hundred large Groupers and Hamlets (*Epinephelus striatus*) are usually confined here; and, when bait is thrown into the pond, the visitor can see only a close array of widely-stretched hungry mouths, each six or eight inches in diameter.

THE RELATIONS OF THE BERMUDIAN FISH-FAUNA.

These islands, considered in reference to their marine fauna, lie on the extreme northern and eastern boundary of the West Indian "Region." All the more characteristic fishes of this "Region" are represented in Bermudian waters, and the invertebrate fauna, as far

as investigated, appears to have very similar relations. The reef-building polyps find here their farthest northern remove from the equator. That the subtropical character of the marine fauna and flora is determined to a great extent by the influence of the Gulf Stream is rendered very evident by comparing the life on the land with that of the surrounding waters. The latter is much the more tropical and West Indian in character; while the former, although many West Indian species are represented in the flora, is a curious assemblage of forms brought together from various quarters by winds, ocean-currents, and the agency of man. Drift-wood and seeds from the Antilles are cast up in great quantities with the flotsam and jetsam of the shore, and many of the commonest plants of the Bermudas are supposed to have found their way thither in this manner. Thus the transporting power of the Gulf Stream appears to have been quite as important in the introduction of tropical forms of life to this group as has been its thermal effect in rendering it a suitable home for them. Since the Bermuda atoll is comparatively recent in origin, it is not difficult to believe that it has thus been supplied with living forms. Many fishes of the West Indian fauna have been found in the waters of the Azores, Canaries, Madeira, the Cape Verde Islands, and other points in the Eastern Atlantic; it appears easy to account for their wanderings by an extension of the action of the same transporting agent.

The occurrence of several strictly European species is also to be noted. All of these appear to be powerful, rapid swimmers, with the exception, perhaps, of *Synodus lacerta*.

The subjoined tables are intended to exhibit the geographical relations of the fishes observed in Bermudian waters. Several of the species mentioned in the paper are not included, since confusion in their synonymy has rendered their limits of distribution doubtful.

The total number of species enumerated is 75. Of these, 18 are so widely distributed as to be of little importance in a comparison of this nature. Of the 57 remaining, 50, or 86 per cent. (68, or 89 per cent. of the whole number, 75), are common to the Bermudas and the West Indies; 18 species, or 32 per cent. of the whole, or 37 per cent. of those common to the two faunas compared above, occur on the coast of Brazil, only 2, however, south of Bahia; 8 species, or 14 per cent., are found on the eastern coast of the United States north of Georgia; 4 of these are undoubtedly accidental there, while 2, *Decapterus punctatus* and *Paratractus pisquetus*, have a range along the coast from Rio de Janeiro to Cape Cod, and the seventh, *Anguilla bostoniensis*, is not sufficiently

established in its specific relations to warrant generalizations; 13 species, or 23 per cent., occur in the Eastern Atlantic; 3 of these have not been recorded west of the Bermudas, and I prefer for the present to consider them as wanderers from the Mediterranean fauna. The relations, faunally, of others, such as *Balistes capriscus* and *Pimelepterus Boscii*, are somewhat problematical.

Four species of marine fishes and one inhabiting brackish water are known to be peculiar to the group.

Species common to the Bermudas and West Indies.

Ostracium triquetrum.	Epinephelus striatus.
Pseudoscarus superbus.	Epinephelus guttatus.
Pseudoscarus cœruleus.	Hypoplectrus puella.
Chærojulis radiatus.	Mugil liza.
Lachnolæmus falcatus.	Auostoma coloratum.
Eucinostomus Lefroyi.	Hemirhamphus Pleii.
Acanthurus cœruleus.	Exocætus exiliens.
Sarothrodus bimaculatus.	Megalops thrissoides.
Calamus megacephalus.	Sardinella anchovia.
Calamus orbitarius.	Harengula macrophthalma.
Lutjanus caxis.	Echidna catenata.
Mesoprion aya.	Zonichthys fasciatus (South Carolina).
Trisotropis guttatus.	

Common to the Bermudas, West Indies, and Eastern Atlantic.

- Chilomycterus reticulatus (Saint Helena).
 Chilichthys Spengleri (Madeira, Cape Verdes, and Western Africa).
 Ostracium quadricorne (Saint Helena, Western Africa, Cape of Good Hope).
 Sphyræna picuda (river Niger).

Common to the Bermudas, Brazil, Cape Verdes, and Ascension Island.

Salarias textilis.

Common to the Bermudas, West Indies, and Northern Brazil.

Malthe vespertilio.	Pareques punctatus.
Scarus radians.	Hæmylum capeuna.
Eucinostomus gula.	Hæmylum chrysopterum.
Hypeneus maculatus (Rio de Janeiro).	Trisotropis undulosus.
Holocentrum sogo.	Hemirhamphus Pleii.

Common to the Bermudas, West Indies, Brazil, and the Eastern Atlantic.

Labrosomus nuchipinnis (Gorea).

Harpe rufus (Saint Helena, Rio de Janeiro).

Glyphidodon saxatilis (Cape Verde Islands; accidental in New England).

Enneacentrus punctatus (Cape Verde Islands).

Gymnothorax moringa (Saint Helena).

Common to the Bermudas, West Indies, Brazil, and the east coast of the United States.

Acanthurus nigricans (South Carolina).

Decapterus punctatus.

Paratractus pisquetus.

Common to the Western Atlantic and Western Pacific??

Anguilla bostoniensis.

Common to the Bermudas, Mediterranean, and Eastern Atlantic.

Sargus variegatus (Madeira).

Synodus lacerta (Madeira).

Sphyræna spet (Canaries).

Common to the Bermudas, West Indies, Madeira, and the Mediterranean.

Pimelepterus Boscii (accidental at New York).

Common to the Bermudas, West Indies, east coast of United States, Madeira, Mediterranean, and the Pacific.

Balistes capriscus.

Pelagic : Atlantic.

Hippocampus, sp.

Exocætus, sp.

Dactylopterus volitans (Mediterranean).

Mustelus canis.

Isuropsis punctata.

Pelagic : both hemispheres.

Paradiodon hystrix.

Coryphæna hippurus.

Alutera scripta.

* *Leptecheneis naucrates*.

Antennarius marmoratus.

* *Ptheirichthys lineatus*.

Trachurops crumenophthalmus.

Regalecus gladius.

Orcynus alliteratus.

* *Sphyrna zygaena*.

* *Naucrates ductor*.

* *Reniceps tiburo*.

* Not personally observed.

Peculiar to the Bermudas.

Syngnathus Jonesii.
Lefroyia bermudensis.

Engraulis chærostomus.
Fundulus bermudæ.

Acclimated.

Carassius auratus.

POPULAR NAMES.

The names in use among the fishermen afford some curious studies. Where practicable, hints in regard to their origin have been given.

I observe that of the thirty-three names given by Catesby* as in use in the Bahamas at the time of his visit to those islands, one hundred and fifty years ago (1724-25), twenty-six are applied to common species in the Bermudas. Nearly all of these are applied to fishes of the same family or genus, and most of them to the same species. This may perhaps be explained by the common origin of the colonists of the two regions. It is an interesting instance of the persistency of common names. Many of these names are in use at the present time in the southern Atlantic States, though usually applied to different species.

Subjoined is a list of names in use among the fishermen, to the application of which I can give no clew:—

Glare-eye Squirrel.	Shad Porgy.	Sunburnt Shark.
Black Jack.	Scotch Porgy.	Rainbow.
Deer Grouper.	Red-tail.	Thumper.
Spanish Hog-fish.	Bone-fish.	Mermaid.
Black Hog-fish.	Grubbe.	Skip-jack.
Clucker.	Yellow Tang.	Slippery Dick.
Sand-eel.	White Belly.	Prickly Hind.
Runner.	Blue Belly.	Sardine.
Blue-bone Porgy.	Permit.	Sand Mullet.
White-bone Porgy.	Sand Shark.	

* The Natural History of Carolina, Florida and the Bahama Islands ; containing The Figures of Birds, Beasts, Fishes, Serpents, Insects and Plants : Particularly the Forest-Trees, Shrubs and other Plants not hitherto described or very incorrectly figured by Authors. Together with their Descriptions in English and French. To which are added, Observations on the Air, Soil and Waters : With Remarks upon Agriculture, Grain, Pulse, Roots, &c. To the Whole is Prefixed a new and correct Map of the Countries Treated of. By MARK CATESBY, F. R. S. London * * * * MDCCCXXI-XLIII. 2 vols. folio.

The English names given to the species in this paper are those which are commonly applied to them by the islanders, and no others are employed.

The following identifications of Catesby's species are suggested in connection with the plates of fishes given in the second volume. These conclusions were reached after a careful examination of the synonymy of the names here proposed as adopted by later writers, especially Linné, who appears to have founded several species upon these figures and descriptions. In many cases, comparative measurements have been made with these plates and the fishes they are supposed to represent, so as to make the identification as accurate as might be. A casual comparison will show the reader how closely the local names correspond to those in use in the Bermudas:—

- T. 1. Umbla minor, marina, &c. (BARRACUDA) is *Sphyræna picuda*.
Vulpis Bahamensis is *Albula conorhynchus*.
- T. 2. Perca marina gibbosa, &c. (THE MARGATE FISH) is (?) *Hæmylum chrysopterum*.
Saurus ex cinereo nigricans (THE SEA SPARROW HAWK) is *Synodus fætens*.
- T. 3. Perca marina, pinna dorsi divisa (THE CROKER) is *Micropogon undulatus*.
Perca marina rubra (THE SQUIRREL) is *Holcocentrum sogo*.
- T. 4. Perca marina rhomboidalis (THE PORK FISH) does not agree with *Lagodon rhomboides*, to which it has been referred. The figure is too indefinite for determination and does not agree with the author's description.
Perca marina pinnis branchialibus carens (THE SCHOOLMASTER) is equally indefinite; the pectoral fins were evidently an afterthought of the artist.
- T. 5. Perca marina venenosa, &c. (THE ROCK FISH) is *Trisotrópis guttatus*, or some allied species.
- T. 6. Perca marina capite striato (THE GRUNT) is some species of *Hæmylum*, perhaps *H. arcuatum*.
Albula bahamensis (THE MULLET) is *Mugil* sp.
- T. 7. Perca marina puncticulata (THE NEGRO FISH) is *Enneacentrus ouatalibi*.
Perca cauda nigra (THE BLACK-TAIL) is very like *Ocyurus chrysurus*.
- T. 8. Hirundo (THE FLYING FISH) is unidentifiable, but is probably the common Barbados species, perhaps *Exocætus Roberti*, M. & T.
Perca marina sectatrix (THE RUDDER FISH) cannot be recognized, but is probably one of the *Stromateidæ*.
Perca fluviatilis gibbosa ventre luteo (THE FRESH-WATER PEARCH) is *Pomotis vulgaris*.
- T. 9. Turdus pinnis branchialibus carens (THE MANGROVE SNAPPER) is quite unrecognizable, the grotesque figure without pectoral fins being evidently imaginary.
- T. 10. Turdus rhomboidalis (THE TANG) is *Acantharus nigricans*.
Turdus cauda convexa (THE YELLOW FISH) is probably *Enneacentrus ouatalibi*.
Compare T. 7, *supra*.

- T. 11. *Turdus flavus* (THE HOG FISH) is perhaps *Harpe rufus*; is certainly a Labroid.
Turdus cinereus peltatus (THE SHAD) is a *Eucinostomus*, and closely resembles the new Bermuda species *E. Lefroyi*.
- T. 12. *Turdus oculo radiato* (THE PUDDING-WIFE) is a young specimen of *Chærojulis radiatus*.
- Alburnus americanus* (THE CAROLINA WHITING) is clearly *Menticirrhus alburnus*, with which its shape and the barbels on the chin would place it, in spite of the manifest omission of the second dorsal fin.
- T. 13. *Mornnyrus ex cinereo nigricans* (THE BONE-FISH) I am unable to identify, though the name is in use at the present day in the Bahamas.
- T. 14. *Cugupuguacu* Brazil (THE HIND) is *Epinephelus guttatus*.
Saltatrix (SKIPJACK) is *Pomatomus saltatrix*.
- T. 15. *Suillus* (THE GREAT HOG-FISH) is *Lachnolæmus falcatus*.
- T. 16. *Aurata Bahamensis* (THE PORGY) is probably *Chrysophrys auratus* or *C. orbicularius*.
- T. 17. *Salpa purpurescens variegata* (THE LANE SNAPPER) I cannot place.
Petimbuabo Brazil (THE TOBACCOPIPE-FISH) is *Fistulari tabaccaria*.
- T. 18. *Novacula cœrulea* (THE BLUE-FISH) is *Pseudoscarus cœruleus*.
- T. 19. *Unicornis, Piscis Bahamensis* (THE BAHAMA UNICORN-FISH) is *Alutera scripta*.
- T. 20. *Muræna maculatus, nigra et viridis* (THE MURAY) closely resembles *Gymnothorax rostratus*.
- T. 21. *Muræna maculata nigra* (THE BLACK MURAY) is not clearly identified.
- T. 22. *Turdus oculo radiato* (THE OLD WIFE) is *Balistes vetula*.
- T. 23. *Bagre, &c.* (THE CAT-FISH) somewhat resembles *Noturus flavus*.
- T. 24. *Harengus minor Bahamensis* (THE PILCHARD) is some small Clupeoid.
- T. 25. *Anthea quartus, Rondeletii* (THE MUTTON-FISH) is a *Lutjanus*, perhaps *L. aya* or some allied form.
- T. 26. *Remora* (THE SUCKING FISH) belongs of course to *Echeneididae*, though lack of detail will not allow even generic identification.
- T. 27. *Solea lunata et punctata* (THE SOLE) I do not know.
- T. 28. *Orbis lævis variegatus* (THE GLOBE FISH) is *Chilichthys turgidus*.
- T. 29. *Psittacus piscis viridis, Bahamensis* (THE PARROT FISH) is *Pseudoscarus Catesbyi*.
- T. 30. *Acus maximus squamosa viridis* (THE GREEN GAR-FISH) is *Lepidosteus ossesus*.
- T. 31. *Acarauna major pinnis cornutis* (THE ANGEL FISH) is *Holacanthus ciliaris*.

FISHES OF THE BERMUDA ISLANDS.

LIST OF SPECIES.

MALTHEIDÆ.

MALTHE VESPERTILIO, (*Linn.*) *Cuv.*, subspecies VESPERTILIO.

DEVIL-FISH.

Lophius fronte unicorni, LINNÉ, Mus. Ad. Fried. 1, 1754, 55.—ARTEDI, Syn. Pisc. 1788, 88.

Guaperva, BROWN, Hist. Jamaica, 1756, 457, pl. 48, f. 3.

Rana piscatrix americana, SEBA, Locup. Rer. Nat. Thes. Desc. 1, 1758, 118, tab. lxxiv, f. 2.

Lophius vespertilio, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 236; ed. 12, 1, 1766, 402.—GMELIN, Linn. Syst. Nat. 1, 1788, 480 (*partim*).—BLOCH, Ichth. iv, 1787, 8, taf. cx. (on a drawing by Plumier).—SCHNEIDER, Bloch, Syst. Ichth. 1801, 140.—LACÉPÈDE, Hist. Nat. Poiss. 1, 1798, 302-315.

Malthe vespertilio, CUVIER, Règne Anim. 1817.—MÜLLER & TROSCHEL in Schomburgk, Hist. Barbados, 1848, 678.—GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 200 (*partim*).—POEY, Mem. ii, 1861, 382; Rep. Fis.-Nat. Cuba, ii, 1868, 406.—COPE, Trans. Am. Phil. Soc. 1870, 480.—GILL in Baird's Rep. Sea Fisheries of New England, 1873, 792.

Malthæa vespertilio, CUV. & VAL., Hist. Nat. Poiss. xii, 1837, 440.—STORER, Syn. Fish. N. Amer. 1846, 131.—GILL, Cat. Fish. E. Coast N. Amer. 1861, 47.—LÜTKEN, Nat. Foren. Vid. Med. 1865, 5.

Malthæa vespertilio, DEKAY, New York Fauna, Fish, 1842, 452.

A single specimen of this species was noticed in the collection of Mr. John T. Bartram, of Stocks Point, Saint George's Island. It is recorded from various points in the West Indies. Dr. Günther has united all described species, except *Malthe cubifrons*, Richardson, under the name *Malthe vespertilio*. The species thus limited is very variable in respect to the length of snout, which in some individuals equals one-sixth of the entire length of the fish, in others reduced to one-twentieth or one twenty-fifth. Professor Lütken recognizes three species within these limits; *Malthe vespertilio*, represented by the synonymy given above;

Malthe longirostris, Cuv. & Val., the Guacucuja of Marcgrave;* and *Malthe notata*, Cuv. & Val. These species seem to correspond with certain limits of variation, and are probably entitled to subspecific rank, particularly since these limits of variation are correlated with their geographical distribution. The form designated as *vespertilio* corresponds to section (δ) of Günther, having the snout one-ninth or one-tenth of the total length, and is recorded from Cuba, Jamaica, Santo Domingo, Porto Rico, and Martinique.

M. longirostris corresponds to section (α) of Günther, having the snout one-sixth of the total length, and is recorded from Bahia and Para.

M. notata was described from Surinam, and, according to Dr. Günther, from young specimens. Dr. Günther identifies it with a Demerara specimen, and refers it to section (ϵ), having the snout one-thirteenth of the total length.

M. angusta, corresponding to section (η) of Günther, with the snout one-twentieth to one twenty-fifth of the total length, represents the minimum development of snout, and is known from Brazil.

Malthe cubifrons, Richardson, is undoubtedly entitled to full specific rank.

ANTENNARIIDÆ.

PTEROPHRYNE PICTA, (Val.) Goode.

DEVIL-FISH; MARBLED ANGLER.

Lophius histrio, var. *b*, *pictus*, SCHNEIDER, Bloch, Syst. Ichth. 1801, 124.

Chironectes pictus, CUV. & VAL., Hist. Nat. Poiss. xii, 293, pl. 364.

Antennarius marmoratus, var. *a*, *picta*, GTHR., Cat. Fish. Brit. Mus. iii, 1861, 186.

A single specimen was given me by C. C. Keane, esq., of Hamilton, and I saw several others. The fish is pelagic, occurring only in the warmer parts of the Atlantic. Its home is among the floating masses of Gulf-weed (*Sargassum bacciferum*). It is often brought ashore in the beds of this alga, which is thrown up among the rocks in great heaps after the winter storms. I have seen its curious nest, consisting of a bunch of eggs adhering in glutinous masses to the *Sargassum*, the whole cluster large enough to fill a quart measure. One of these was thrown ashore in February, and is now in the collection of J. Matthew Jones, esq., of Halifax, Nova Scotia.

* Historia Naturalis Brasilæ, 1648, p. 143.

DIODONTIDÆ.

PARADIODON HYSTRIX, (*Linné*) *Bleeker*.

SEA HEDGEHOG; SEA PORCUPINE.

Guamajacu Guara, MARCGRAVE, Hist. &c. Brazil. 1648, 158.

Diodon Hystrix, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 335; ed. 12, 1, 1766, 413 (not Gmelin) Linné, Syst. Nat. 1, 1788, 449, according to BARNEVILLE, Revue zoologique 1846, 141).—POEY, Mem. ii, 1861, 361.—GÜNTHER, Cat. Fish. Brit. Mus., viii, 1870, 306.—COPE, Trans. Am. Phil. Soc. 1870, 480.

Paradiodon hystrix, BLEEKER, Atl. Ichth. v, 1865, tab. ccvii, f. 2.—POEY, Rep. Fis. Nat. Cuba, ii, 1868, 430.

Erizo, PARRA, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 60, lam. xxix, f. 1-2.

Diodon atinga, BLOCH, Ichth. iv, 1787, 75, taf. cxxv, (not Linné).—GMELIN, Linné, Syst. Nat. 1, 1788, 1449.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 511.—LACÉPÈDE, Hist. Nat. Poiss. ii, 1801, 1-3.—SHAW, Gen. Zool. v, 1804, 434.—MÜLL. & TROSCH. in Schomburgk, Hist. Barbados, 1848, 677.—KAUP, Wiegmann's Arch. Naturg. xxi, 1855, 227.—JOUAN, Anim. Nouv. Caledonie, Mem. Soc. Imp. Sci. Nat. Cherbourg, 1861-'63, 18.—BLEEKER, Enum. Pisc. Arch. Ind. 1859, 203.

Diodon attinga, RUPPELL, Verzeichn. Senckenb. Mus. Fisch. 1852, 35.

Diodon Plumieri, LACÉPÈDE, op. cit. ii, 1, 1801, 1-10, pl. iii, f. 3.

Diodon Brachiatus, SCHNEIDER, op. cit. 213 (founded on Parra's figure No. 1, cited above.)

Diodon punctatus, CUVIER, Mem. Mus. Hist. Nat. iv, 1818, 132, and Règne Animal, 1817, p.—BLEEKER, Verhandl. Bat. Gen. xxiv, Blootk. Vissch. 1852, 19.

This species, common in the West Indies, recorded also from the Pacific and the Indian Archipelago, is occasionally found here, and, on account of its bristly skin, is greatly prized by curiosity-hunters. It is never eaten. I saw four specimens, each about eighteen inches long.

CHILOMYCTERUS RETICULATUS, (*Linn.*) *Bibron*.

Orbis muricatus et reticulatus, WILLUGHBY, Ichthyographia, 1685, 155, tab. J, No. vii.—SEBA, Locup. Rer. Nat. Thes. Desc. iii, 1758, 58, tab. xxiii, f. 3.

Ostracion subrotundus, aculeis undique brevibus triquetris raris, ARTEDI, Gen. Pisc. 1738, 52, No. 16.

Diodon reticulatus, LINNÉ, Syst. Nat. 1, 1758, 334.—GMELIN, Linné, Syst. Nat. 1, 1788, 1449.

Chilomycterus reticulatus, BIBRON *apud* BARNEVILLE, Revue Zoologique, 1846, 141.—BLEEKER, Atl. Ichth. v, 1865, 54.—GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 313.

Diodon atringa β, LINNÉ, op. cit. ed. 12, 1, 1766, 413.

? *Diodon atinga*, POEY, Mem. ii, 1861, 361; Rep. Fis. Nat. Cuba, ii, 1868, 429.—COPE, Trans. Am. Phil. Soc. 1870, 480.

Dr. Günther records a single specimen from the Bermudas. Another, in the University Museum at Middletown, Connecticut, is said to have come from the same locality.

Additional data are necessary in order to determine the true relations of Linné's *Diodon atringa* (*atinga*). Barneville and Bleeker consider it identical with *Diodon orbicularis* of Bloch. Günther does not commit himself decidedly, although he cites, under *Chilomycterus geometricus*, Maregrave's *Guamajacu atinga*, upon which the species of Linné is presumably founded. The relations of the species *D. atinga* are important as throwing light upon the relations of the genus *Diodon*, of which it must be considered the type; there can be little doubt, however, that Bleeker is right in retaining in this genus those forms which have three rather than two roots to their spines.

TETRODONTIDÆ.

CHILICHTHYS SPENGLERI, (*Bloch*) Goode.

SWALLOW; PUFF-FISH.

Tetrodon Spengleri, BLOCH, Ichth. iv, 1787, 134, taf. cxliv.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 504.—LACÉPÈDE, Hist. Nat. Poiss. i, 1798, 476-501.—SHAW, Gen. Zool. v, 1804, 445.—GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 284.—COPE, Trans. Am. Phil. Soc. 1870, 479.

Tetrodon Plumieri, LACÉPÈDE, op. cit. 476-504, pl. xx, f. 3 (on a drawing by Plumier).

Tetrodon marmoratus, RANZANI, Nov. Comm. Acad. Bonon. iv, 1840, 72, pl. x, f. 1.—LÖWE, Trans. Zool. Soc. ii, 1841, 193.—VALENCIENNES in Webb and Berthelot, Hist. Nat. Canaries, Poiss. 1836, pl. xx, f. 2.

A single specimen of two inches was found on the beach at Bayley's Bay. The species ranges from Madeira and Northwestern Africa to the Caribbean, and no doubt frequently occurs about the Bermudas. Bloch, in his description, figures the species with the imperforate nasal tentacles of the genus *Arothron*, giving the East Indies as its habitat. Making due allowances for the notorious carelessness of early ichthyologists in fixing the localities of specimens, and for the lack of detail in their drawings, we believe that the present name should be retained, since the fish figured by Bloch is unmistakably the one before us. Should time render it necessary to adopt another name, that of Ranzani, who described the species accurately, may be substituted.*

Color.—Above, light chestnut; beneath, clear white; a lateral band

* *Tetrodon marmoratus*, RANZANI, Novi Commentarii Acad. Sci. Inst. Bonon. iv, 1840, p. 72, pl. x, fig. 1.

of tawny white, from chin to base of caudal rays, where it is confluent with a ring of the same color around the extremity of the caudal peduncle; beneath this lateral band a row of brown spots, of irregular size and fifteen in number, three being on the caudal peduncle; above a similar row, often very obscure. Caudal brown, with broad, median transverse band of yellow; other fins immaculate.

When inflated with air, the diameter of the belly is considerably greater than half the entire length of the fish.

Its habits are doubtless very similar to those of *Chilichthys turgidus* (Mitch.) Gill, common on the east coast of North America from Cape Cod to the Antilles, which it much resembles, and which is very likely to occur in the Bermuda waters.

OSTRACIIDÆ.

OSTRACIUM TRIQUETRUM, *Linu.*

CUCKOLD.

Ostracion triangulus, tuberculis, exiguis numeris aculeis carens, ARTEDI, Gen. Pisc. 1738, 57; Syn. Pisc. 1738, 85.

Ostracion polyodon incermis triqueter, LINNÉ, Mus. Ad. Fried. 1, 1754, 60.

Ostracion triqueter, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 330; ed. 12, 1, 1766, 407.—BLOCH, Ichth. iv, 1787, 106, taf. cxxx.—GMELIN, Linné, Syst. Nat. 1, 1788, 1441.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 498.—LACÉPÈDE, Hist. Nat. Poiss. 1, 444.—SHAW, Gen. Zool. v, 1804, 420.—MÜLL. & TROSCHE, in Schomburgk, Hist. Barbados, 1848, 677.—HOLLARD, Ann. Sci. Nat. 1857, 154.—GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 256.

Ostracion triquetrum, POEY, Mem. ii, 1861, 361; Rep. Fis.-Nat. Cuba, ii, 1868, 442.

Ostracium triquetrum, COPE, Trans. Am. Phil. Soc. 1870, 475.

Rhinesomus triqueter, SWAINSON, Nat. Hist. Fish. & Rept. ii, 1839, 324.

Common, as it also is throughout the West Indies and the Gulf of Mexico. Its length seldom exceeds eight inches. Its habits are sluggish, and it hugs very closely the bottom, where it is frequently taken in fish-pots.

The locomotion of the trunk-fishes is very peculiar, and I found an excellent opportunity for observing the movements of a Cuckold confined in my aquarium. The propelling force is exerted by the dorsal and anal fins, which have a half-rotary, sculling motion resembling that of a screw-propeller; the caudal fin acts as a rudder, save when it is needed for unusually rapid swimming, when it is used as by other fishes. The chief function of the broad pectorals appears to be that of fanning a

current of water through the gills, thus aiding respiration, which would otherwise be difficult on account of the narrowness and inflexibility of the branchial apertures.

When taken from the water, one of these fishes will live for two or three hours, all the time solemnly fanning its gills, and when restored to its native element seems none the worse for its experiences, except that, on account of the air absorbed, it cannot at once sink to the bottom. The Cuckold is not valued for food, though I am unable to learn that its use is ever followed by fatal results such as attend it in some of the West Indies.*

The local name is not applicable, and has probably been transferred from some other fish, as, for instance, the following species, which is known in Jamaica as "the cuckold."

Color.—Dark brown, thickly studded with circular spots of yellowish-white, each about two lines in diameter. The epidermis is often abraded, leaving the shell uniform tawny-white.

OSTRACIUM QUADRICORNE, *Linné*.

COW-FISH.

Piscis triangularis cornutus Clusii, WILLUGHBY, Hist. Pisc. 1686, xiv, tab. J.

Ostracion triangularis 2 aculeis &c., ARTEDI, Syn. Pisc. 1738, 85, No. 9.

Ostracion quadricornis, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 331; ed. 12, 1, 1766, 408.—BLOCH, Ichth. iv, 1787, 113, taf. cxxxiv.—GMELIN, Linné, Syst. Nat. 1, 1788, 1442.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 499.—LACÉPÈDE, Hist. Nat. Poiss. 1, 1798, 442, 468.—SHAW, Gen. Zool. v, 1804, 424.—KAUP, Wiegmann's Arch. Naturg. xxi, 1855, 218.—HOLLARD, Ann. Sci. Nat. 1857, 148.—BLEEKER, Poiss. Guinea, 1863, 20.—GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 258.

Ostracion quadricorne, POEY, Mem. ii, 1861, 362; Rep. Fis.-Nat. Cuba, ii, 1868, 439.

Ostracion (Acanthostracion) quadricornis, BLEEKER, Atl. Ichth. 1865, 32.

Ostracium quadricorne, COPE, Trans. Am. Phil. Soc. 1870, 474.

Lactophrys quadricornis, SWAINSON, Hist. Nat. Fish. & Rept. ii, 1839, 324.

Chopin, PARRA, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 31, lam. xvii.

Ostracion Lister, LACÉPÈDE, op. cit. 468, pl. xxiii, f. 2.

Ostracion sexcornutus, MITCHILL, Amer. Month. Mag. ii, 1818, 328.

Lactophrys sexcornutus, STORER, Syn. Fish. N. Am. 1846, 246.

Ostracion cornutus, MÜLL. & TROSCH. in Schomburgk, Hist. Barbados, 1848, 677 (not Linné or Bloch).

Ostracion maculatus, HOLLARD, op. cit. 149.

Common; its habits much like those of *Ostracium triquetrum*. Its range is much wider, including Saint Helena, Guinea, the Cape of

* Schomburgk, History of Barbados, p. 677.

Good Hope, and Charleston, S. C. Its occurrence in the Indian Archipelago is extremely doubtful, as Bleeker himself admits. This species is extremely variable, in length, breadth, and height of body, length of tail, and length of caudal, and these variations seem to be individual as well as related to age. Hollard's *Ostracion maculatus* * and the various *species dubia* of Poey † will probably prove to be forms of this species.

The presence of plates upon the caudal peduncle is apparently accidental. They may possibly have some relation to sex, but certainly none to age. Out of fourteen specimens examined, five had plates above and below, one had two above, and six had none. In none of the specimens can I distinguish traces of the spine in the middle of the dorsal ridge mentioned by Dr. Günther. The color of young specimens is well described by Günther; the bands on the cheek are, however, of a bright blue. Adult specimens are colored in a rich bright blue, which quickly vanishes after death. In some individuals, the color is worn from the ridges of the carapace, leaving patches of light brown. The largest specimens are twenty-one inches long.

The Cow-fish is, I was told, much esteemed for food, and is frequently baked whole in its shell. The popular name, like the Cuban "*toro*" and the Jamaican "cuckold," refers to the two horn-like supra-orbital spines.

BALISTIDÆ.

BALISTES CAPRISCUS, *Gmelin.*

TURBOT.

Balistes capriscus, GMELIN, Linné, Syst. Nat. 1, 1788, 1471.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 476.—LACÉPÈDE, Hist. Nat. Poiss. 1798, 1, 372, pl. xiii, f. 3.—SHAW, Gen. Zool. v, 1804, 411.—RISSE, Ichth. Nice, 1810, 51.—YARRELL, Brit. Fish. ii, 1841, 472.—HOLLARD, Ann. Sci. Nat. 1854, 309.—GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 217.—GILL, in Baird's Rep. on Sea Fisheries of Southern New England, 1873, 793.

Balistes fuliginosus, DEKAY, New York Fauna, Fishes, 1842, 339, pl. lvii, f. 188.—STORER, Syn. Fish. N. Am. 1846, 243.

Capriscus fuliginosus, GILL, Cat. Fish. E. Coast N. Am. 1861, 56.

Common. Very erratic in its distribution, having been observed in the Pacific at Panama, at Madeira, in the Mediterranean, and on the coast of Great Britain. DeKay figures a specimen taken in New York Harbor; the

*Annales des Sciences Naturelles, vii, p. 148.

†Repertorio Fisico-Natural de la Isla de Cuba, ii, pp. 439-440.

United States National Museum has specimens from Wood's Hole, Mass., Charleston, S. C., and the Tortugas; it is not recorded from the West Indies. The Turbot attains a weight of five or six pounds; its flesh is not unpalatable, and its tough, shagreen-like skin is used for polishing purposes. It has a habit of swimming on its side, just at the surface, like the Sunfish (*Mola rotunda*), and, from this habit as well as perhaps a fancied similarity of its form to that of the European Turbot (*Rhombus maximus*), its name appears to have been derived. It no doubt breeds in these waters; I have seen young individuals not exceeding three inches in length. The species should be compared with *Balistes sobaco*, Poey. No other species of this subfamily were observed.

I suppose the "Old-wife," "Ocean-turbot," and "Black-turbot" of the fishermen to correspond respectively to *Balistes vetula*, Linné, *Canthidermis maculatus*, (Gmelin) Bleeker, and *Melichthys buniva* (Lacépède), all of which, as well as *Balistes ringens*, Linné, are quite certain to occur in these waters.

ALUTERA SCRIPTA, (Osbeck) Bleeker.

Unicornis Piscis Bahamensis, CATESBY, Nat. Hist. Carol. Florida, and the Bahama Islands, ii, 1743, 19, tab. 19.

Balistes scriptus, OSBECK, Iter. Sin. 1765, 144.—GMELIN, Linné, Syst. Nat. 1, 1788, 1463.

Aluteres scriptus, BLEEKER, Ned. Tyds. Dierk. iii, 1865, 28; Ichth. 1865, 141, tab. ccxxvii, 4.

Monacanthus scriptus, GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 252.

Lija Trompa, PARRA, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 46, lam. xxii, f. 1.

Balistes Lævis, BLOCH, Ichth. xii, 1797, 63, tab. ccccxiv.—SHAW, Gen. Zool. v. 1804, 405.

Aluterius lævis, CUVIER, Règne Animal, 1817.—CANTOR, Cat. Malayan Fish. 355.—BLEEKER, Verhandl. Batav. Gen. xxiv (Balistidæ), 21.—HOLLARD, Ann. Sci. Nat. 1855, 15.—DAY, Fish. Malabar, 1865, 355.

Alutera lævis, SWAINSON, Nat. Hist. Fish. & Rept. ii, 1839, 327.

Aleuteres lævis, RICHARDSON, Voy. H. M. S. Sulphur, 1845, 131, pl. lxi, f. 3.

Balistes Monoceros, var. *Lævis*, SCHNEIDER, Bloch, Syst. Ichth. 1801, 463.

Balistes ornatus, PROCÉ, Bull. Philom. 1822, 131.

Aluteres pareva, LESSON, Voy. Coquille, ii, 1830, 106.

Aluterus venosus, HOLLARD, op. cit. 14, pl. 1, f. 3.

Alutera picturata, POEY, Proc. Acad. Nat. Sci. Phila. 1863, 183; Rep. Fis.-Nat. Cuba, ii, 438.

Aleuteres picturatus, COPE, Trans. Am. Phil. Soc., 1870, 476.

A specimen twenty-one inches long was taken off the islands in April, 1872. The occurrence of the species is so unusual that it has no common name. It appears to be strictly pelagic, and is recorded from China, the Indian Archipelago, Tahiti, New Ireland, Coromandel, the Canaries, the West Indies, Brazil, and South Carolina.

HIPPOCAMPIDÆ.

HIPPOCAMPUS, *sp.*

SEA-HORSE.

Two specimens, apparently of different species, were secured; but, owing to the unsatisfactory nature of the published descriptions, it is impossible at present to identify them. One agrees tolerably with *H. antiquorum*, Leach.

SYNGNATHIDÆ.

SYNGNATHUS JONESII, *Günther.*

Syngnathus Jonesii, GÜNTHER, Ann. & Mag. of Nat. Hist. 1874.

This species was deservedly dedicated to J. Matthëw Jones, esq., F. L. S., who is doing so much toward elucidating the natural history of these islands. Pipe-fishes are not uncommon. *S. pelagicus*, Osbeck, is likely also to occur.

AULOSTOMIDÆ.

AULOSTOMA MACULATUM, *Valenciennes.*

TRUMPET-FISH.

Trompetero colorado, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 63, lam. xxx, f. 2.

Aulostoma maculatus, VALENCIENNES in Cuvier, Règne Animal, 1817; ill. ed. Poiss. 1829, pl. xcii, f. 2.

Aulostoma coloratum, MÜLL. & TROSCH. in Schomburgk's Hist. Barbados, 1848, 173.—

GÜNTHER, Cat. Fish Brit. Mus. iii, 1861, 536.—POEY, Rep. Fis.-Nat. Cuba, ii,

1868, 386.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 480.

A dried head of this species was shown me by C. C. Keane, esq., of Hamilton. The fishermen speak of two Trumpet-fishes found here, one of them designated the Black Trumpet-fish. One of these is probably *Fistularia tabaccaria*, Linné. Mr. J. Matthew Jones informs me of the capture, in 1874, of a specimen of *Fistularia serrata*, Cuv., hitherto known only from the Indian and Pacific Oceans.

FIERASFERIDÆ.

LEFROYIABERMUDENSIS, *Jones.*

Lefroyia Bermudensis, JONES, Zoologist, Jan., 1874, 3838.

A single specimen four and one-half inches long was taken by Governor Lefroy in the summer of 1873.

“Total length rather more than $4\frac{1}{2}$ inches. Greatest depth at the ver-

tical of the pectorals, three lines and one-half. The length of the head is slightly more than one-seventh of the total length. The greatest width of the head is rather less than one-third of its length. Body naked, attenuate, compressed. Facial outline rugose. Eye moderate; horizontal diameter of the eye-cup, one and three-quarter lines; vertical diameter, one and one-quarter lines. Gape of mouth wide. Lower jaw shorter, and received within the upper. Cardiform teeth of irregular size in both jaws, vomer, and palatines; those of the latter largest. Branchiostegals seven, inflated, united below. Vent thoracic. Pectorals originating at the upper angle of the operculum, three lines in extent, of delicate soft rays. Dorsal indistinct, commencing in a groove at about the vertical of the twentieth anal ray, continuous to caudal extreme; when in conjunction with the anal, it forms a small filamentous tip. Anal prominent, commencing immediately behind the vent, in advance of the vertical to the upper angles of the operculum, and extending to the caudal extreme. About its centre, it is equal in depth to that of the body at the same position. Owing to the delicate texture of the fins, it is impossible to determine the number of rays, but those of the anal exceed one hundred and forty. Color when dried, out of spirit, golden-yellow. The body transparent, showing the vertebra within, a condition, according to General Lefroy, equally observable in life."—*Jones*.

The genus proposed by Mr. Jones has not yet been defined, and the name *Lefroyia* can be adopted only provisionally.

BLENNIIDÆ.

LABROSOMUS NUCHIPINNIS, (*Quoy & Gaimard*) *Poey*.

MOLLY MILLER.

Clinus nuchipinnis, QUOY & GAIMARD, Voy. Uranie et Physicienne, Zool. 1824, 255.—

GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 262.

Labrosomus nuchipinnis, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 308.

Clinus pectinifer, CUV. & VAL., Hist. Nat. Poiss. xi, 1836, 374 (female).—MÜLL. & TROSCH. in Schomburgk's Hist. Barbados, 1848, 671.—CASTELNAU, Anim. Nouv. &c. Amérique du Sud, 1855, Poiss. 26.

Labrisomus pectinifer, SWAINSON, Nat. Hist. Fishes &c. 1839, 277.—COPE, Trans. Am. Phil. Soc. 1870, 473.

Labrosomus pectinifer, GILL, Proc. Acad. Nat. Sci. Phila. 1860, 105.—POEY, Mem. Hist. Nat. Cuba. ii, 1861, 381.

Clinus capillatus, CUV. & VAL., op. cit. 377 (male).—MÜLL. & TROSCH., l. c.

Labrisomus capillatus, SWAINSON, l. c.

Labrosomus capillatus, GILL, op. cit. 107.—POEY, l. c.

Lepisoma cirrhosum, DEKAY, New York Fauna, Fishes, 1842, 41, pl. xxx, f. 94.—STORER.
Syn. Fish. N. Am. 49.

Very common under stones in tide-pools and in crevices; their habits closely resembling those of the "Rock-eel" (*Muraenoides mucronatus*), so familiar to naturalists on the New England coast. Some individuals are brilliantly colored with red beneath, while others are gray. These differences are most probably sexual. My largest specimens are four inches long. The species is recorded from the Antilles, Bahia, Gorea, and the National Museum has specimens from Florida.

SALARIAS TEXTILIS, Q. & G.

Salarias textilis, QUOY & GAIMARD, MS.—CUVIER & VALENCIENNES, Hist. Nat. Poiss. xi, 307.

? *Salarias vomerinus*, CUV. & VAL., op. cit. 349.

Salarias vomerinus (CUV. & VAL. ?) JENYNS, Zool. Voy. H. M. S. Beagle, Fishes, 1842, 88, pl. 17, f. 3.

This species, found in tide-pools in company with the preceding, appears to be identical with that brought by Quoy and Gaimard from the Isle of Ascension. The measurements do not agree precisely with those given by Valenciennes (which are expressed in very general terms); its colors, however, are precisely the same. It agrees in many points with the specimens collected by Darwin at Porto Praya, and provisionally referred by Jenyns to *Salarias vomerinus*, C. & V.

The Bermuda specimens have the vomerine teeth and the four ventral rays, the omission of which in the description of *Salarias textilis* was Jenyns's chief reason for not referring the Cape Verde specimens to that species. The affinities of *S. textilis* and *S. vomerinus*, always considered close, have some light thrown upon them by the discovery of vomerine teeth in the former. The question of their identity, however probable it may seem, must be decided by the comparison of a larger series of specimens. Such study will probably result in the establishment of a new genus for the reception of the species at present referred to *Salarias*, which possess vomerine teeth.

A detailed description of the Bermuda specimens is given for convenience in future comparisons. The greatest height of the body, at the beginning of the dorsal, is slightly less than one-sixth (0.16) of the extreme length, and is four-fifths of the length of the head; the height of the lowest part of the caudal peduncle equals one-half the greatest height of the body (0.08). The head measures one-fifth (0.20) of total

length. The eye is slightly elliptical, and its longitudinal diameter equals the length of the snout, or one twenty-fifth (0.04) of the total length. The interorbital space equals half the diameter of the orbit, and is concave. The profile is very obtuse, and the eye is situated just within the angle formed by profile and crown. There are two broadly-palmated superciliary filaments, not so long as the diameter of the orbit; two similar but smaller ones at the nostrils; also two short filaments, one on either side of the nape. The lips are crenated at the sides of the mouth, though not anteriorly. In addition to the row of numerous small movable teeth common to all the species of the genus, there is a long recurved canine tooth on each side of the lower jaw, behind the series of small teeth; also, a transverse row of minute teeth on the anterior portion of the vomer.

The dorsal fin originates just behind the nuchal filaments, at a distance from the snout (0.22) slightly greater than the length of the head; its spinous portion nearly equals its soft portion, the former measuring 0.30, the latter 0.31. A deep notch almost separates the two parts.

The anal fin originates at a distance from the snout equal to one-half the length of the body exclusive of the caudal (0.42). Its first ray measures 0.07, its penultimate ray 0.12, its ultimate ray 0.05. The caudal is four twenty-fifths (0.16) of the total length, and is slightly rounded at the extremity. The pectorals equal the head in length (0.20), and barely reach to the vent. The distance from the snout to the upper axilla of the pectorals equals the distance to the origin of the ventrals, and also the length of the ventrals (0.11).

The lateral line is faintly indicated by a delicate line, arching above the pectorals, then running straight along the middle.

The radial formula is as follows:—D., XII-15; A., II, $15\frac{1}{2}$; C., 3-6-5-3; P., 14; V., I-4.

The color is greenish above, becoming white beneath. Twelve or fourteen brownish-violet cross-bands, arranged in pairs, and in part interrupted by three series of whitish dots, so as to form a row of quadrate blotches just above the lateral line. The third row of white dots is more pronounced, the dots becoming short lines, and is situated on the lateral line; a fourth series, less pronounced, may be seen near the lower edge of the body.

A Y-shaped figure of brown upon the chin, the arms extending forward, and three other fine brown lines on each side of the throat, extending transversely upward and backward, continued upon the cheek and opercle by lines of fine brown dots. A row of similar dots may be seen

a little below the base of the anterior part of the dorsal. The fasciæ upon the sides extend on the dorsal, where they take an oblique direction backward. They are most pronounced at the base of the dorsal, forming a series of squares at the point of its junction with the body. The caudal has five or six irregular vertical lines. The anal is pale at its base, the tips of the rays dark brown, pectorals and ventrals dusky.

Measurements.

Extreme length, 0 ^m .062.....	1.00
Body : Greatest height	.16
Head : Length.....	.20
Greatest width	.14
Length of snout.....	.04
Width of interorbital area	.02
Eye : Diameter	.04
Dorsal (spinous) : Distance from snout.....	.22
Length of base.....	.31
Greatest height	.08
(soft) : Length of base.....	.30
Greatest height.....	.31
Anal : Distance from snout.....	.42
Height at first ray	.11
Height at last ray	.05
Pectoral : Distance from snout at axilla.....	.11
Length	.20
Ventral : Distance from snout.....	.11
Length	.11

TRIGLIDÆ.

DACTYLOPTERUS VOLITANS, (*Linné*) *Cuv.*

Pirapebe or *Miivipira*, MARCGRAVE, Hist. &c. Brasil, 1648, 162.

Trigla volitans, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 302; ed. 12, 1, 1766, 498.—GMELIN, Linné, Syst. Nat. 1, 1788, 1346.—BLOCH, Ichth. x, 1797, 93, taf. cccli.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 12.—SHAW, Gen. Zool. iv, 622, pl. xci.

Dactylopterus volitans, CUV. & VAL., Hist. Nat. Poiss. iv, 1829, 117.—DEKAY, New York Fauna, Fish. 1842, 49, pl. xvii, f. 46.—MÜLLER & TROSCHER, Schomburgk, Hist. Barbados, 1848, 667.—GUICHENOT, Explor. Scient. Algérie, Rept. & Poiss. 1850, 41.—CASTELNAU, Anim. Nouv. &c. Amérique du Sud, Poiss. 1855, 26.—POEY, Mem. ii, 1861, 367; Rep. Fis.-Nat. Cuba, ii, 1868, 304.—GILL, Cat. Fish. E. Coast N. Am. 1861, 43; Baird's Rep. on Sea Fisheries of Southern New England, 1873, 799.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 222.—BAIRD, Rep. on Sea Fisheries of Southern New England, 1873, 824.

Morcielago, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 25, lam. xiv.

Polynemus sexradiatus, MITCHILL, Amer. Month. Mag. 1818, 323 (figured as "The Six-rayed Polyneme," Trans. Lit. & Phil. Soc. N. Y. 1815, pl. iv. f. 10).

Dactylopterus communis, OWEN, Descr. Cat. Ost. Series, Roy. Soc. Surg. 1, 1853, 56.

Gonocephalus macrocephalus, GRONOW, Cat. Fish. (1780), ed. Gray, 1854, 106.

Rare and without a common name. The Colonial Museum at Hamilton and Mr. Bartram's collection at Saint George's each contain a dried specimen. Mr. Jones secured one in Hamilton Harbor in October, 1851.

The species ranges from Newfoundland to Rio de Janeiro, throughout the West Indies, and to the Cape Verde Islands, and the Mediterranean, where it is comparatively common.

SCARIDÆ.

SCARUS RADIANS, Valenciennes.

SPANISH PORGY.

Scarus radians, CUV. & VAL., Hist. Nat. Poiss. xiv, 1839, 207.—STORER, Syn. Fish. N. Am. 1846, 147.—GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 207.—GUICHENOT, Mem. Soc. Imp. Sci. Nat. Cherbourg, 1865, 10.—COPE, Trans. Am. Phil. Soc. 1870, 462.

Labrus radians, CASTELNAU, Anim. Nouv. &c. Amérique du Sud, 1855, 29.

Common, occurring in large schools. The greatest length observed was eight inches. Though seined in quantity, the Spanish Porgies are not eaten, their flesh, like that of the other members of this family, being dry and flavorless.

The species is recorded from Bahia, Mexico, and Saint Martin's. Specimens from Barbados and Jamaica are in the National Museum. Bermuda appears to be the northern limit of its range.

Color.—Above, olive, tinged with reddish-brown; beneath, rose-color; head, upper part of body, and dorsal marbled with brown; caudal irregularly banded with black, the extremity and spots on the membrane white; anal immaculate (in six specimens); base of pectorals black; chin white.

PSEUDOSCARUS VETULA, (Schneider) Gill.

MUD FISH.

Vieja, PARRA, Descr. Dif. Picz. Hist. Nat. Cuba, 1787, 58, lam. 28. fig. 1.

Scarus vetula, BLOCH-SCHNEIDER, Syst. Ichth. 1, 1801, 289 (description founded on Parra's figures).—CUV. & VAL., Hist. Nat. Poiss. xiv. 1839, 193.—STORER, S n. Fish, N. Amer. 145.—MÜLLER & TROSCHEL in Schomburgk's History of Barbados, 1848, 674.—COPE, Trans. Am. Phil. Soc. 1870, 461.

Pseudoscarus vetula, GILL, MS.

Scarus superbus, POEY, Mem. Hist. Nat. Cuba, ii, 1860, 218.

Pseudoscarus superbus, GÜNTHER, Cat. Fish Brit. Mus. iv, 1862, 218.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 346.

Pseudoscarus psittacus, GÜNTHER, op. cit. 225.

The Mud-fish is very common, its gorgeous colors making it very conspicuous as it swims. The young may be seen by the hundred in the shallow rock-pools, while in the deeper waters the larger fish are sailing about with the precision and regularity of a squadron of cavalry under drill. Though its flesh is not unpalatable, this fish is not often brought to market; the enormous scales are much used in fancy work. The species is recorded from several Antilles.

The young fish differ much from the adult in coloration, their markings closely approximating those of *Pseudoscarus sanctæ-crucis* (Schn.) Gthr. Since no specimens of the latter species measuring more than eight or nine inches are on record, and none of *P. vetula*, in adult coloring, less than eighteen inches in length have fallen under my observation, it seems possible that the two species may be the same in different stages of growth, particularly since both are usually recorded from the same locality. The question of their identity may be easily decided by the Bermudian naturalists.

As is indicated in the synonymy, *vetula* is the specific name properly belonging to this species. Parra (l. c.) gives an excellent figure of the fish under the name *Vieja*, and on this figure Schneider founded his *Scarus vetula*, the specific name being a translation of Parra's *Vieja*. Of this fact, Valenciennes was aware, and by it he was guided in adopting the name of Schneider. Professor Poey renamed the species with the remark: "C'est à tort que M. Valenciennes rapport la figure de Parra au *Sc. vetula*," seemingly forgetful that Schneider's name was founded not upon specimens, but upon Parra's figure solely. Dr. Günther, adopting the views of Prof. Poey, cites *Scarus vetula* as a synonym of *Pseudoscarus psittacus*, (Linn.) Gthr.

PSEUDOSCARUS CÆRULEUS, (Bloch) Günther.

"CLAMACORE" OR "KILMAGORE."

Novacula cærulea, CATESBY, Nat. Hist. Carolina, Florida and the Bahama Islands, ii, 1743, 18, pl. 18.

Coryphæna cærulea, BLOCH, Ichth. v, 120.—GMELIN, Linné, Syst. Nat. 1, 1788, 1791.

Scarus cæruleus, SCHNEIDER, Bloch, Syst. Ichth. 1, 1801, 288.

Pseudoscarus cœruleus, GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 227—GUICHENOT, Proc. Soc. Imp. Sci. Nat. Cherbourg, 1865, 24.—POEY, Rep. Fis. Nat. Cuba, ii, 1861, 348.

Trompa, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 57, lam. xxvii, f. 2.

Loro, PARRA, l. c. f. 1.

Scarus loro, SCHNEIDER, op. cit. 288.

Scarus trilobatus, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 21.

Sparus holocyanosus, LACÉPÈDE, op. cit. 45.

The "Clamacore" or "Kilmagore" is very unusual in Bermudian waters; a single specimen of thirty-six inches was taken outside the reefs in April, 1872, and was an object of much curiosity. The color in life was brilliant turquoise-blue, fading to olive-green in alcohol. The species is recorded from Cuba and some of the adjoining islands.

Dr. Günther suggests that this species is probably only the adult stage of one of the other species, such as *Pseudoscarus chloris*,* but an ex-

* The study of the synonymy of this species has brought to light an error, which may be referred to here. It appears that Parra's *Vieja*, No. 3, and Schneider's *Scarus chloris*, founded upon the figure of Parra, belong, not to *Pseudoscarus*, as is intimated by Dr. Günther, but to *Scarus*; such is the judgment of Professor Poey after consulting the type of Parra's description, preserved in the Museum in Madrid. M. Guichenot, after an examination of the types in the Musée d'Histoire Naturelle, Paris, retains in this genus *Scarus virens*, Valenc. There now remains only *Scarus quadrispinosus*, Val., as a synonym of Günther's *Pseudoscarus chloris*, and, of these names, that of Valenciennes has undoubted priority. The reversed synonymy should stand then somewhat as follows:—

SCARUS CHLORIS, Schn.

Vieja, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 59, lam. 28, f. 3.

Scarus chloris, SCHNEIDER, Bloch, Syst. Ichth. 1801, 289 (on Parra's figure).—COPE, Trans. Am. Phil. Soc. 1870, 461.

Pseudoscarus chloris, GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 227.

Scarus virens, CUV. & VAL., Hist. Nat. Poiss. xiv, 1839, 203.—STORER, Syn. Fish. N. Am. 1846, 146.—MÜLLER & TROSCHEL in Schomburgk's Hist. Barbados, 1848, 674.

Scarus chrysopterus, SCHNEIDER, op. cit. 286, pl. lviii.—CUV. & VAL., op. cit. 185.—STORER, op. cit. 143.—COPE, op. cit. 462.

Scarus lateralis, POEY, Mem. Hist. Nat. Cuba, 1860, ii, 219; Rep. Fis. Nat. 1, 1867, 337, 375.

HABITAT.—Cuba, Santa Cruz, Saint Christopher's, Saint Thomas, Martinique, Porto Rico, Barbados.

PSEUDOSCARUS QUADRISPINOSUS, (Valenc.) Guichenot.

Scarus quadrispinosus, CUV. & VAL., Hist. Nat. Poiss. xiv, 1839, 197.—STORER, Syn. Fish. N. Am. 1846, 144.

Pseudoscarus quadrispinosus, GUICHENOT, Proc. Soc. Imp. Sci.-Nat. Cherbourg. 1865, 27.

? *Scarus obtusus*, POEY, Mem. Hist. Nat. Cuba, ii, 1860, 217; Rep. Fis.-Nat. ii, 1868, 349.

Pseudoscarus chloris (not Bloch), GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 227.—COPE, Trans. Am. Phil. Soc. 1870, 461.

HABITAT.—Saint Thomas, Cuba, Jamaica, Bahamas.

amination of specimens has convinced me that this is not the case. In the National Museum are two well-characterized specimens of *Pseudoscarus cæruleus*, measuring nine and fifteen inches respectively, both of which have the hump upon the profile well developed, though not so prominent as in the adult specimen of thirty-six inches. Parra's two figures (lamina xxviii) named "Loro" and "Trompa" represent different ages of this species, the prolonged caudal lobes as well as the additional size of the caudal lobe being characters of age.

LABRIDÆ.

CHÆROJULIS RADIATUS, (*Linné*) *Goode*.

BLUE-FISH.

Turdus Oculo radiato (Pudding-wife), CATESBY, Nat. Hist. Carol. &c. 1743, ii, 12, tab. xii, fig. 1.

Sparus radiatus, LINNÉ, Syst. Nat. ed. 12, 1, 1776, 472.—GMELIN, Linné, Syst. Nat. 1, 1788, 1278.

Doncella, PARRA, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 95, lam. xxxvii, fig. 1.

Julis cyanostigma, CUV. & VAL., Hist. Nat. Poiss. xii, 1839, 391 (type 6 inches long).—MÜLL. & TROSCH. in Schomburgk's Hist. Barbados, 1848, 673.—STORER, Syn. Fish. N. Am. 1846, 139.

PlatyGLOSSUS cyanostigma, GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 161.—COPE, Trans. Am. Phil. Soc. 1870, 464.

Chærojulis cyanostigma, POEY, Rep. Fis. Nat. Cuba, ii, 1868, 334.

Julis Principis, CUV. & VAL., op. cit. 402, (type 11 inches long).—STORER, op. cit. 140,

PlatyGLOSSUS principis, GÜNTHER, op. cit. 164.

Julis patatus (partim), CUV. & VAL. op. cit. 398 (types 13 to 15 inches long).—STORER op. cit. 140.

The Blue-fish is frequently taken in the pots, though not valued as food. My largest specimen measures sixteen inches. The common name refers to the color of the adult fish. The species is recorded from several of the West India islands.

Color.—In the adult, a brilliant azure-blue, each scale edged with bright pearly-green. A longitudinal band on anal and the margin of the dorsal light blue. In the young, the prevailing hue is brownish, a large light-blue spot on the base of each scale. Head with spots and longitudinal stripes of light blue. Dorsal with broad margin, and four lines of spots and blotches, longitudinally arranged, of the same color. Caudal with broad white margin, outer rays blue to the extremity, the base of the fin thickly spotted with the same. Anal with border and two longitudinal lines of blue, the fin being thus divided into three

nearly equal parts, a large circular spot of the same color at the base of each ray except the first. Pectoral with the first five rays and a narrow transverse line across the base from the fourth ray blue.

My notes on the colors of young and adult specimens of this species have led me to believe that the different ages have been described under several different specific names, as the synonymy given above would indicate. *Julis cyanostigma* was the name given by Cuvier and Valenciennes to specimens six inches in length, *Julis principis* to those of eleven inches, while those ranging from thirteen to fifteen inches are included under *Julis patatus*. The specimens of larger size (*"l'individu à plus de quinze pouces"*), included under the latter name, probably belong to another species. The 'Mudian fishermen recognize the difference in color to be caused by age.* I have seen specimens with the colors of immaturity, which had attained the length of ten inches. It will probably be found that the change of color is not restricted to any fixed period in the growth of the fish. Should farther investigations sustain the opinion of Dr. Günther† that Linné's *Sparus radiatus* is a different species from that figured by Catesby, the specific name *cyanostigma* should be retained.

LACHNOLÆMUS FALCATUS, (Linné) Val.

HOG-FISH.

Suillus (Great Hog-fish), CATESBY, Hist. Carol. Florida and the Bahama Islands, ii, 1743, 135, tab. xv.

Labrus falcatus, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 284; ed. 12, 1, 1766, 475.—GMELIN, Linné, Syst. Nat. ed. 1, 1788, 1287.—LACÉPÈDE, Hist. Nat. Poiss. &c. iii, 1803, 425, 463.

Lachnolaimus falcatus, CUV. & VAL., Hist. Nat. Poiss. xiii, 276.—GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 87.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 330.—COPE, Trans Am. Phil. Soc. 1870, 464.

Lachnolaimus aigula, CUV. & VAL., op. cit. 277, tab. 388 (type 11 inches long).—STORER, Syn. Fish. N. Am., 136.

Lachnolaimus dux, CUV. & VAL., op. cit. 285 (type 8 inches long).—STORER, l. c.

Lachnolaimus suillus, CUV. & VAL., op. cit. 286 (type 24 inches long).—STORER, l. c.

Lachnolaimus caninus, CUV. & VAL., op. cit. 288 (type 10 inches long).—STORER, l. c.

Lachnolaimus psittacus, CUV. & VAL., op. cit. 291.—STORER, l. c.

Very common here, as it is throughout the West Indies. Hog-fish

* Since the above was written, I find that very similar conclusions have been reached by Professor Poey, who gives under *Chærojulis cyanostigma* a synonymy much like the above.

† Cat. Fish. Brit. Mus. iv, p. 164, note.

Ledge, at the entrance to Hamilton Harbor, is marked by a pyramid of stone, called the "Hog-fish Beacon," which is surmounted by a huge iron image of a Hog-fish.

The long streamer-like appendages or continuations of the vertical fins give to the Hog-fish as it swims a singularly graceful appearance. The beauty of those exposed in the market is frequently marred, however, by having had these ornaments bitten off by the craw-fish and lobsters confined with them in the wells of the boats.

The Hog-fish attains the weight of twenty pounds, and is among the choicest of table-fish; its hard, white, exquisitely-flavored flesh has never been found injurious here, though in some parts of the West Indies it is regarded with suspicion. The common name refers to the swine-like profile and dentition.

HARPE RUFUS, (*Linné*) *Gill*.

SPANISH LADY-FISH.

Pudiano vermellio, MARCGRAVE, Hist. &c., Brasil, iv, 1648, 145.

Turdus flavus (Hog-fish), CATESBY, Nat. Hist. Carol. Florida and the Bahama Islands, ii, 1743, 11, tab. xi, f. 1.

Labrus rufus, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 284; ed. 12, 1, 1766, 475.—GMELIN, Linné, Syst. Nat. 1, 1788, 1287.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 244.—LACÉPÈDE, Hist. Nat. Poiss. iii, 1803, 427.

Cossyphus rufus, GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 108.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 463.

Harpe rufus, GILL, Proc. Acad. Nat. Sci. Phil. 1863, p. 222.

Bodianus rufus, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 331.

Perro colorado, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 3, lam. iii, fig. 1.

Bodianus bodianus, BLOCH, Ichth. vii, 1797, 24, tab. cexxiii.

Cossyphus bodianus, CUV. & VAL., Hist. Nat. Poiss. xiii, 1839, 103.

Lutjanus verres, BLOCH, op. cit. tab. cclv.

Sparus verres, SHAW, Gen. Zool. iv, 1803, 414.

Cossyphus verres, CASTELNAU, Anim. Nouv. ou Rares, Amérique du Sud, Ichth. 1855, 27.

Sparus falcatus, BLOCH, op. cit. tab. cclviii.

Bodianus Blochii, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 279, 290.

Harpe cæruleo-aureus, LACÉPÈDE, op. cit. 426, 427, tab. viii, fig. 2.

Labrus semiruber, LACÉPÈDE, op. cit. iii, 428.

Not common. The species is also recorded from various of the West India Islands, the Gulf of Mexico, Bahia, Rio de Janeiro, and Saint Helena. Closely-related species are known in the Spanish and French Antilles under the names "Doncella" and "Demoiselle," and the Bermu-

dian name may perhaps be interpreted to mean "the fish which the Spanish call Lady-fish." The name is not inappropriate, for the species is remarkable for the grace of its form and the beauty and elegance of its colors. My specimens measure eight inches.

Color.—Head and upper half of body to the third ray of the soft dorsal rich chestnut-brown; the remainder, including the lower half of the operculum, bright golden-yellow.

The lips have conspicuous folds. The pre-operculum is *very perceptibly denticulated*. The two anterior ventral rays and the soft dorsal and anal and the caudal lobes are much produced, the dorsal and anal prolongations extending to the middle of the median caudal rays; the outer caudal rays are twice as long as the median.

POMACENTRIDÆ.

GLYPHIDODON SAXATILIS, (*Linné*) *Cuvier*.

COW-PILOT; SERGEANT-MAJOR.

Jaguacaquare, MARCGRAVE, Hist. &c. Brasil. iv, 1648, 156.

Sparus fasciis quinque transversis fuscis, LINNÉ, Amœn. Acad. i, 1749, 312.

Chætodon fasciis quinque albis, cauda bifurca, LINNÉ, Mus. Ad. Fried. i, 1754, 54.

Chætodon saxatilis, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 277; ed. 12, 1, 1766, 466.—GMELIN, Linné, Syst. Nat. 1, 1788, 1253.—BLOCH, Ichth. vi, 1787, 71, tab. ccvi, f. 2.

Glyphisodon saxatilis, CUV. & VAL., Hist. Nat. Poiss. v, 1830, 446.—MÜLLER & TROSCHEL Schomburgk's Hist. Barbados, 1848, 674.—CASTELNAU, Anim. Nouv. ou Rares, Amérique du Sud, 1855, 11.

Glyphidodon saxatilis, GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 36.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 329.—COPE, Trans. Am. Phil. Soc. 1870, 461.

Chætodon Marginatus, BLOCH, op. cit. tab. ccvii.—LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 451, 463.

Chætodon Mauriti, BLOCH, op. cit. tab. ccxiii, f. 1.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 234.—LACÉPÈDE, op. cit. 452, 470.

Chætodon sargoides, LACÉPÈDE, op. cit. 453, 471, 472.

Very common in sheltered waters. The largest, six to eight inches in length, frequent the shallow shaded coves in company with *Pseudoscarus vetula*, *Holacanthus ciliaris*, and *Sarothrodus bimaculatus*. The young may be seen basking in every shallow tide-pool. The origin of the common name is not apparent, unless it refers to some supposed relation between this species and the Cow-fish (*Acanthostracium quadricorne*), such as *Naucrates ductor* is supposed by sailors to hold with the Sharks. The fish is sometimes called the "Sergeant-major," in allusion to the chevron-like bands of yellow on the sides. The species is very common through-

out the West Indies, and has been observed as far south as Bahia and east to the Cape Verde Islands. Its accidental occurrence at Newport, R. I., has been recorded.

Color.—Adults golden-green, young golden-yellow, with five black cross-bands, which are not as broad as the interspaces between them, the first from a point in front of the origin of the dorsal to the base of the pectoral; the second below the third and fifth dorsal spines; the third from the eighth and tenth dorsal spines toward the vent; the fourth from the twelfth and thirteenth dorsal spines to the middle of the anal; the fifth below the end of the soft dorsal and continued on the posterior rays of the dorsal and anal.

The ventrals, soft dorsal, and anal are produced; the fourth and fifth rays of soft dorsal and the fifth and sixth of anal longest. Dorsal and anal prolongations in young reaching to a point half-way between the posterior angle of dorsal and the base of caudal rays; in adults reaching quite beyond the base of caudal rays. External caudal rays twice the length of median.

GERRIDÆ.

EUCINOSTOMUS GULA, (*Cuv. & Val.*) Goode.

SHAD.

Gerres gula, CUV. & VAL., Hist. Nat. Poiss. vi, 1830, 464.—JENYNS, Zool. Voy. H. M. S. Beagle, 1842, 58.—GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, 255.—MÜLLER & TROSCHEL, Schomburgk, Hist. Barbados, 1848.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 368.

Diapterus gula, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 323.

Common and secured in quantity in the shallow bays, with *Decapterus punctatus*, *Eucinostomus Lefroyi*, and *Trachurops crumenophthalmus*. The largest specimens seen, which were apparently adult, measure six inches in length; intermediate sizes down to one inch were observed.

The species has also been seen about Martinique, Santo Domingo, Cuba, Jamaica, and Bahia. The "*Turdus cinereus peltatus*" of Catesby,* for which he gives the common name of "Shad," seems to be identical with this species or the closely-allied *Eucinostomus aprion*, if not with the following species.

EUCINOSTOMUS LEFROYI, Goode.

LONG-BONED SHAD.

Diapterus Lefroyi, GOODE, Amer. Journ. Sci. & Arts, viii, 1874, (Aug.) 123.

This species is distinguished from all other members of the family and genus by its relatively greatly-elongated form. The body is fusiform,

* Natural History of Carolina, Florida, and the Bahamas, ii, p. 11, tab. xi, fig. 1.

compressed; its greatest height, at the thoracic region, being a little less than one-fourth (0.23) of the total length, and a little more than one-fourth (0.27) of the length without caudal (0.89). In *Eucinostomus aprion*, the most elongated of the species hitherto described, the greatest height is but one-third of the length.

The height of the body is uniform under the spinous portion of the dorsal, sloping gently, and at a nearly uniform angle above and below, to the middle of the caudal peduncle. The height of the body behind the dorsal (0.10) is less than one-half, that of the least height of the tail (0.06) is one-fourth of the greatest height of the body.

The scales are large, measuring 0.03 and 0.04 in height, and 0.02 and 0.03 in length; they form about forty-five oblique transverse rows between the head and the caudal, four and a half longitudinal rows between the back and the lateral line, and ten longitudinal between rows the lateral line and the belly.

The length of the head (0.22) equals the greatest height of the body, and is double the greatest width of the head (0.11); the height at the pupil (0.14) is double the width of the interorbital space (0.07). The length of the snout (0.06) equals the length of the operculum (0.06); when the mouth is protruded, the length of the snout is doubled (0.12), and when retracted, the posterior extremity of the intermaxillary process extends to the vertical through the center of the pupil. The nasals are very prominent, and the nostrils are nearer to the orbit than to the extremity of the jaw. The orbit is circular, its diameter (0.08) one-third the length of the head.

The origin of the dorsal is slightly behind that of the ventral; its distance from the snout (0.31) twice the length of its base (0.16). The dorsal spines are graduated nearly in the proportion (I = 0.02; II = 0.12; III = 0.11; IV = 0.10; V = 0.09; VI = 0.085; VII = 0.725; VIII = 0.05; IX = 0.04). The notch between the spinous and soft portions is very deep, and the connecting membrane barely perceptible. In the soft dorsal, the fifth ray is the longest (0.09), and equals the fifth spine; the succeeding rays diminishing regularly to the last, which equals the ultimate spine (0.04); the length of its base (0.20) is greater than that of the spinous dorsals. The anal begins behind the center of the body (0.56); the first spine is very short (0.01), one-fifth the length (0.05) of the second, which is slender; the first ray is the longest (0.08); the succeeding rays regularly diminishing in length to the last (0.03). The lobes of the caudal are equal; the outer rays in length (0.21) five times the inner ones (0.04). The extremity of the pectoral reaches the vertical from the last dorsal spine; its distance

from the snout at the axilla (0.25) is nearly equal to the length of the body. The ventral spine resembles the fifth dorsal spine in shape and size. The length of the longest ray (0.11) slightly exceeds one-third of the distance from the snout to the ventral axilla (0.30); the axillary appendage consists of four lanceolate scales, the first and the longest as long as the last ventral ray.

Color.—Silvery, with a bluish tint above; axils of the pectorals and extremity of snout brownish. Radial formula: D. IX, 10; A. II, 8, P. 12; V. I, 5; C. 3, 9, 9, 3.

The unit of measurement used above is the one-hundredth of the total length, which in an average specimen is 7.29 inches (0^m.185). The species is common in the protected inlets about the islands, in company with the preceding species, the "Shad." The "Long-boned Shad" are in much demand for bait, and are easily seined in large quantities.

The species is dedicated to his excellency Maj. Gen. J. H. Lefroy, F. R. S., governor of the Bermudas, a gentleman of well-known scientific attainments and reputation, who, while doing so much for the social and political welfare of the islands, is also taking an active part in the development of their natural history.

Since the publication of the preliminary description of this fish, I have had the opportunity of comparing specimens from the Bermudas with others sent from Havana to the National Museum by Professor Poey, by whom the species had been recognized as new, and described in MS. under the name of *Eucinostomus productus*. The specimens are precisely the same, and coincide in having only two anal spines; a character in which they differ from the remainder of the genus, and which may prove to be, as suggested by Professor Poey, an indication of generic distinction.

TEUTHIDIDÆ.

ACANTHURUS NIGRICANS, (*Linné*) *Gill*.

DOCTOR-FISH.

Turdus rhomboidalis, CATESBY, Nat. Hist. Carolina, Flor. and the Bahama Islands, ii, 1743, 10, tab. x, fig. 1.

Chætodon nigriscens cauda albescente æquali utrinque aculeata, ARTEDI, Desc. Spec. Pisc. 90.

Chætodon nigricans, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 274; ed. 12, 1, 1766, 462.—GMELIN, Linné, Syst. Nat. 1, 1788, 1245.

Acanthurus nigricans, GILL in Baird's Report Sea Fisheries of Southern New England, 1873, 801.

Acanthurus cæruleus, SCHNEIDER, Bloch, Syst. Ichth. 1801, 214.—CUV. & VAL., Hist. Nat. Poiss. x, 1835, 179.—GUICHENOT, Poiss. in Sagra, Hist. Nat. Cuba, 1845, 121.—STORER, Syn. Fish. N. Amer. 1846, 112.—CASTELNAU, Anim. Nouv. ou Rares, Amérique du Sud, 1855, 25, pl. 12, f. 2.—GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 336.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 355.—COPE, Trans. Am. Phil. Soc. 1870, 474.

Not uncommon. The species extends through the West Indies, and has also been observed on the coasts of Florida and South Carolina. Its quick nervous movements, as it plays about the recesses in the reef, are very characteristic. The local name has reference to the lancet-like processes on the sides of the caudal peduncle. The "Barbero" and "Barbeiro" of Cuba and Brazil, and the "Chirurgien-bleu," "Porte Lancette," and "Saigneur" of the French Antilles, are names of similar origin.

Color.—Bluish-brown; dorsal and anal with numerous obliquely longitudinal lines of light blue. Caudal spine amber-colored, glassy, posteriorly half as long as anteriorly. A prominence in front of orbit; profile of snout slightly concave. Operculum, pre-operculum, and scapular bones with deep striæ. Upper jaw with seven, lower with eight five to eight lobed incisors.

ACANTHURUS CHIRURGUS, (*Bloch*) *Schneider*.

DOCTOR-FISH.

Chætodon nigricans, BLOCH, Ichth. vi, 1787, 60, tab. cciii (not Linné).

Acanthurus nigricans, SCHNEIDER, Bloch, Syst. Ichth. 1801, 211.

Chætodon chirurgus, BLOCH, op. cit. tab. ccviii.—GMELIN, Linné, Syst. Nat. 1788, 1259.

Acanthurus chirurgus, SCHNEIDER, op. cit. 214.—CUV. & VAL., Hist. Nat. Poiss. x, 1835, 168.—GUICHENOT, Poiss. in Sagra, Hist. Nat. Cuba, 1845, 120.—STORER, Syn. Fish. N. Am. 1846, 112.—CASTELNAU, Anim. Nouv. ou Rares, Amérique du Sud, 1855, 24.—GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 329.—POEY, Rep. Fis. Nat. Cuba, ii, 1868, 355.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 474.—GILL in Baird's Rep. Fisheries of Southern New England, 1873, 801.

Aconurus fuscus, GRONOW, Cat. Fish. (1780), ed. Gray, 1854, 191.

This species undoubtedly occurs, associated as it always is with the preceding. The name "Tang," found in the list of local names, is probably applied to one or both, if we can judge from the remarkable correspondence of the local names in the Bermuda and Bahama groups.

CHÆTODONTIDÆ.

SAROTHRODUS BIMACULATUS, (*Bloch*) *Poey*.

FOUR-EYED FISH.

Chætodon bimaculatus, BLOCH, Ichth. vii, 1797, tab. cecxix, f. 1.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 225.—CUV. & VAL., Hist. Nat. Poiss. vii, 1831, 67.—STORER, Syn. Fish. N. Am. 1846, 86.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 9.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 371.

Sarothrodus bimaculatus, POEY, Rep. Fis. Nat. Cuba, ii, 1868, 353.—COPE, Trans. Am. Phil. Soc. 1870, 474.

The "Four-eyed Fish" is usually seen in sheltered coves, lazily swimming a few feet below the surface, under the shadow of some high rock. Its local name has reference to the eye-like spots near the tail, which the fishermen believe to be a true pair of eyes. The species is also recorded from the northern West Indies.

Color.—Pearly-gray; snout, posterior edge of operculum, base of pectoral, the anal, caudal, and dorsal bright yellow, blending into the gray of the body. A band, black, edged with yellow, extends from a point in front of and below the first dorsal spine across the eye to the margin of interoperculum; soft dorsal with a large round indistinct black spot at its base between the fifth and twelfth rays, and a small spot of deep black at its angle; soft dorsal with narrow marginal line of black; soft anal with narrow, submarginal band of light blue, anteriorly edged with black; caudal with terminal band of bluish-white, with bright-yellow center; base of ventrals blotched with yellow.

HOLACANTHUS CILIARIS, (*Linné*) *Lacépède*.

ANGEL-FISH.

Acarauna major pinnis cornutis, CATESBY, Nat. Hist. Carolina, Florida, and the Bahama Islands, ii, 31, tab. xxxi, 1743.

Chætodon griseus fasciis quatuor fuscis, LINNÉ, Mus. Ad. Fried. 1, 1754, 62, tab. xxxiii, f. 1.

Chætodon ciliaris, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 276; ed. 12, 1, 1766, 465.—GMELIN, Linné, Syst. Nat. 1, 1788, 1252.—BLOCH, Ichth. vi, 1788, 83, taf. cecxiv.—SCHNEIDER, Bloch, Syst., Ichth. ed. 1801, 218.

Holacanthus ciliaris, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 527-534.—CUV. & VAL. Hist. Nat. Poiss. vii, 1831, 154.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 46.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 371; Rep. Fis.-Nat. Cuba, ii, 1868, 351.—GILL, Baird, Rep. on Sea Fisheries of Southern New England, 1873, 802.

Gabelita, PARRA, Desc. Dif. Piezas Hist. Nat. Cuba, ii, 1787, 11, tab. vii, f. 1.

Chætodon Parrae, SCHNEIDER, op. cit. 235 (on Parra's figure).

Chætodon squamulosus, SHAW, Nat. Misc. —, 275.

Chætodon Catesbeii, SHAW, Gen. Zool. iv, 1, 1803, 325.

Chætodon cornutus, DESMAREST, Déc. Ichthyol.

Chætodon aculeatus, GRONOW, Cat. Fishes (1780), ed. Gray, 1854, 72.

Common. The species is found, also, in the West Indies, at Bahia, and on the coasts of Mexico. The Angel-fish is partial to sheltered parts of the reef, where it may be seen lazily and gracefully swimming or floating a few feet below the surface. Its motions are very slow, and it frequently swims upon its side, or, sinking to the bottom, swims perpendicularly to the surface, where its bright colors flash for a moment as it floats broadside upward. I have frequently seen them grazing upon the alga-covered rocks. The Angel-fish attains the weight of four pounds, and as far surpasses all the other fishes of the region in its delicious flavor as in its lovely hues. The largest I have seen measured fifteen inches from snout to extremity of soft dorsal.

Color.—Brown with a shade of olive-green, each scale edged with a lighter tint; on the dorsal and anal fins, the brown has reddish tinge. Chin, nape, base of pectoral, borders, and spines of operculum and preoperculum, bright cobalt-blue. Extremity of pectorals, bright yellow. Borders of dorsal and anal bright blue, passing through a vivid green to bright yellow on the slender streamers formed by the prolongations of the soft dorsal and anal fins. Caudal bright yellow, with narrow border of greenish blue. Base of ventrals blue, passing through green into yellow at the extremities. Young and half-grown individuals are ornamented with three or four broad transverse bands of blue and yellow.

My specimens, some twelve in number, differ from all descriptions in the absence of the spot of brown, encircled with blue, on the nape. I have examined numerous West Indian specimens and find it universally present. Should this character prove constant, the Bermuda Angel-fish may be considered a geographical variety, *Holacanthus ciliaris*, var. *Bermudensis*.

HOLACANTHUS TRICOLOR, (Bloch) Lacépède.

BLACK ANGEL-FISH.

Acarauna, EDWARDS, pl. 583, f. 4.

La Veuve Coquette, DUHAMEL, Trait. Gén. Pesch. 1782, pt. 2, pl. 13, f. 1.

Catalineta, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 12, lam. vii, f. 2.

Chætodon tricolor, BLOCH, Ichth. xii, 1797, tab. 425.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 219.

Holacanthus tricolor, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 525-530.—CUV. & VAL., Hist. Nat. Poiss, vii, 1831, 162.—CASTELNAU, Anim. Nouv. ou Rares, Amér. du Sud, 1855, 19.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 49.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 371; Rep. Fis.-Nat. Cuba, ii, 1868, 352.

Occasional. Mr. Jones captured a specimen in 1871, and the name occurs on the local list. The species occurs throughout the West Indies, and is also recorded from Bahia and Trinidad.

Chaetodon arcuatus, (Linn.) Cuvier, is also likely to occur in these waters.

XIPHIIDÆ.

The name of "Sword-fish" occurs on the local list. The common Sword-fish (*Xiphias gladius*, Linn.) must occur in Bermuda waters, and probably also *Tetrapturus albidus*, Poey, and *Histiophorus americanus*, Cuv. & Val.

The following reference to the Sword-fish occurs in "Newes from the Bermudas," a pamphlet dated Burmuda, July, 1609, and reprinted in "Force's Historical Tracts," vol. ii.

Whale, Sword-fish & Threasher.—"The sword fish swimmes under the whale, & pricketh him upward: The Threasher keepeth above him, & with a mighty great thing like unto a flaile, hee so bangeth the whale, that hee will roare as though it thundered, & doth give him such blowes, with his weapon, that you would thinke it to be a crake of great shot."—(Page 22.)

SCOMBRIDÆ.

ORCYNUS ALLITERATUS, (*Rafinesque*) Gill.

MACKEREL.

Scomber alliteratus, RAFINESQUE, Caratteri &c. Anim. Sicilia, 1810, 46.

Orcynus alliteratus, GILL, Baird, Rep. Sea Fisheries of Southern New England, 1873, 802.—BAIRD, Rep. Sea Fisheries of Southern New England, 1873, 825.

Maquereau à Quatre Points, GEOFFR. ST. HILARIE, Desc. Egypt. Hist. Nat. 1813, pl. xxiv, f. 3.

Thynnus Leachianus, RISSO, Hist. Nat. Eur. Merid. iii, 1827, 414.

Thynnus thunnina, CUV. & VAL., Hist. Nat. Poiss. viii, 1831, 104.—BLEEKER, Verhandl. Batav. Genootsch. xxiv, 1851, 36.—TEMM. & SCHLEG., Fauna Japonica Poiss. 1850, 95, pl. 48.—GUICHENOT, Rept. et Poiss. Exp. Scient. Algérie, 1850, Poiss. 57.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 364.

Orcynus thunnina, POEY, Rep. Fis.-Nat. Cuba, 1, 1867, 321; ii, 1868, 362.

Thynnus Brasiliensis, CUV. & VAL., op. cit. 110.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 373.

Thynnus vagans, LESSON, Voy. Coquille, Zool. ii, 1830, 162, pl. cxxxii.

Large schools were observed in March. This large and powerful pelagic fish has been observed in the Mediterranean, on the east of Norway, in the East Indies, on the coasts of Brazil and Cuba, and was found in 1871 by Professor Baird in large numbers at Wood's Hole, Mass., and several have since been taken on the shores of Southern New England. It is highly valued for bait, but is the only large fish which is not thought good to eat; though rather oily, I think it superior to many of the Bermuda food-fishes. It attains the length of two feet and a half.

CARANGIDÆ.

DECAPTERUS PUNCTATUS, (*Agassiz*) *Gill*.

ROUND ROBIN.

Scomber hippos, MITCHILL, Amer. Month. Mag. 1818, 246 (not Linné), (figured as "The Hippos Mackerel," Trans. Lit. & Phil. Soc. N. Y. 1815, pl. 5, f. 5).

Caranx punctatus, AGASSIZ, Selecta Gen. et Spec. Pisc. Brasil, coll. Spix, 1829, 108, pl. lvi a, f. 2.—CUV. & VAL., Hist. Nat. Poiss. ix, 1833-38.—DEKAY, New York Fauna, Fish, 1842, 122, pl. 73, f. 123 (copied from Mitchill).—STORER, Syn. Fish. N. Am. 1846, 101.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 446.

Decapterus punctatus, GILL, Proc. Acad. Nat. Sci. Phila. 1862, 432; and in Baird, Rep. on Sea Fisheries of Southern New England, 1873, 803.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 368 (see, also, Mem. ii, 374).—BAIRD, Rep. on Sea Fisheries of Southern New England, 1873, 825.

Very common. This species ranges along the coast from Brazil to Cape Cod, and has been seen at Cuba and Martinique. The Round Robin is seined in great numbers in Hamilton Harbor, in company with the various species of *Clupeidæ* and *Gerridæ*, and is sold from row-boats along the quay at the legal rate of four-pence a pound. The largest measure six inches. "Jigging robins" is a favorite amusement of the little negroes. A few bread-crumbs are thrown over the dock, and the little fish collect in such numbers that a line with a bare fish-hook jerked rapidly through the group seldom fails to impale one or more. The local name seems to be fanciful in origin; at Barbados, it is given to the allied species *Decapterus macarellus*, which perhaps also occurs at the Bermudas.

Color.—Above, olive-brown; beneath, white, with pearly reflections. A golden stripe along the lateral line, studded with small black spots, which cease at the commencement of the lateral plates. Eye yellow, with black iris.

TRACHUOPS CRUMENOPHTHALMUS, (*Bloch*) *Gill*.

GOGGLER; GOGGLE-EYE.

Scomber crumenophthalmus, BLOCH, Ichth. x, 1797, 65, taf. cccxliii.

Caranx crumenophthalmus, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 107.—CUV. & VAL., Hist. Nat. Poiss. ix, 1833, 62.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 429.

Trachurops crumenophthalmus, GILL, Proc. Ac. Nat. Sci. Phila. 1862, 432; and in Baird, Reps. on Sea Fisheries of Southern New England, 1873, 803.—POEY, Rep. Fis. Nat. Cuba, ii, 1868, 367.—BAIRD, Rep. on Sea Fisheries of Southern New England, 1873, 825.

Scomber balantiophthalmus, SCHNEIDER, Bloch, Syst. Ichth. 1801, 29.

Scomber plumieri, BLOCH, op. cit. tab. cccxiv.—SCHNEIDER, op. cit. 30.

Caranx plumieri, CUV. & VAL., op. cit. 65.—MÜLL. & TROSCHE, Schomburgk, Hist. Barbados, 1848, 669.—GUICHENOT, Poiss. in Sagra, Hist. Nat. Cuba, ii, 1845, 110.

Caranx Daubentonii, LACÉPÈDE, op. cit. iii, 59, 71.

Caranx macrophthalmus, RÜPPELL, Atlas, Reise Nord-Africa, Fische, 1828, 97, tab. xxv, f. 4 (not Agassiz).

Caranx macrophthalmus, AGASSIZ, in Spix, Select. Gen. & Spec. Pisc. Brasil, 1829, 107, pl. lvi a, f. 2 (not Rüppell).

Caranx mauritanus, QUOY & GAIMARD, Voy. Uranie & Physicienne, Zool. 1824, 359.

Common; the species, like the preceding, is found in the West Indies and on the coast of the United States to Southern Massachusetts; it is found also at Mauritius, in the Pacific and Indian Oceans, the Red Sea, and on the coast of Guinea. The Goggler reaches the weight of a pound, is found with the preceding, and is used for food. The local names refer to its great, staring eyes.

Color.—Above, bluish; beneath, silvery white.

PARATRACTUS PISQUETUS, (*Cuv. & Val.*) *Gill*.

JACK; BUFFALO JACK.

Caranx pisquetus, CUV. & VAL., Hist. Nat. Poiss. ix, 1833, 97.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 373.

Paratractus pisquetus, GILL, Proc. Ac. Nat. Sci. Phila. 1862, 432; Baird's Rep. Sea Fisheries of Southern New England 1873, 803.—POEY, Rep. Fis. Nat. Cuba, ii, 1868, 365.—BAIRD, Rep. Sea Fisheries of Southern New England, 1873, 825.

Caranx chrysos, DEKAY, Fishes, New York Fauna, 1842, 121, pl. xxvii, f. 85 (not *Scomber chrysos*, Mitchill).—BAIRD, Fishes New Jersey Coast, 1855, 22.

Carangus chrysos, GIRARD, Ichth. U. S. & Mex. Bound. Surv. 1859, 23.

Caranx hippos, HOLBROOK, Ichth. South Carolina, 1856, 88, pl. xii, fig. 2 (not *Scomber hippos*, Linné).

Carangus hippos, Gill, Cat. Fish. E. Coast N. Am. 1861, 36.

Trachurus squamosus, GRONOW, Cat. Fish. (1780), ed. Gray, 1854, 125.

The Jack, or Buffalo Jack, is common, occurring also in the West

Indies and on the coast of Brazil, and the United States as far north as Cape Cod. Its habits closely resemble those of the preceding species. My largest specimen is nine inches long; the fishermen claim that the species attains the weight of five or six pounds, but they probably confound this with some other species of the same family.

Color.—Above, light slate; beneath, pearly white; snout and line over the orbit blue. Second dorsal margined with black. Base of lateral plates and tip of caudal light brown.

NAUCRATES DUCTOR, (*Linné*).

PILOT-FISH.

Gasterosteus ductor, LINNÉ, Syst. Nat. ed. 10, 1, p. 295.

Naucrates ductor, CUV. & VAL., Hist. Nat. Poiss. viii, p. 312, pl. 332.

This universally-distributed species occasionally finds its way into the hands of the Bermudian fishermen.

ZONICHTHYS FASCIATUS, (*Bloch*.) Swainson.

BONITO.

Scomber fasciatus, BLOCH, Ichth. x, 61, taf. cccxli, 17; Syst. Ichth. ed. SCHNEIDER, 29.

Seriola fasciata, CUV. & VAL., Hist. Nat. Poiss. ix, 211, 1833.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 464.

Zonichthys fasciatus, SWAINSON, Nat. Hist. Fish. & Rept.—GILL, Cat. Fish. E. Coast N. Am. 1861, v, 36, and in Rep. U. S. Com. Fish. 1871, 803.

Halatractus fasciatus, POEY, Rep. Fis. Nat. Cuba, ii, 373, 1868.

Not uncommon; recorded also from Cuba and South Carolina. A specimen was taken near New York in October, 1875, and is now in the National Museum. The Bonito is an excellent table-fish, and reaches the length of two feet or more.

The “Amber-fish,” the “Guelly,” or “Cavally” (Caballa?), the “Slippery Dick,” and the “Skip-jack” of the fishermen probably belong to this family; but, as I secured no specimens, they cannot be identified. The “Skip-jack” is perhaps an *Oligoplites*, and the “Amber fish” is doubtless a *Seriola*.

CORYPHÆNIDÆ.

CORYPHÆNA HIPPURUS, *Linn*.

DOLPHIN.

Coryphæna hippurus, LINNÉ, Syst. Nat. ed. 12, i, 446.

I observed a Dolphin, measuring five or six feet, playing about our steamer in the Gulf Stream, about two hundred miles northwest of the Bermudas. The Dolphin is well known to the fishermen.

MULLIDÆ.

HYPENEUS MACULATUS, (*Bloch*) *Cuv.*

GOAT-FISH.

Pira metara, MARCGRAVE, Hist. &c. Brasil, 1648, 156, 181.

Mullus maculatus, BLOCH, Ichth. x, 1797, 79, tab. 348.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 78.

Upeneus maculatus, CUV. & VAL., Hist. Nat. Poiss. iii, 1829, 478.—STORER, Syn. Fish. N. Am. 1846, 48.—POEY, Mem. Hist. Nat. Cuba, i, 1853, 223; ii, 1861, 367.—CASTELNAU, Anim. Nouv. &c. Amérique du Sud, Pois. 1855, 6.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 408.—COPE, Trans. Am. Phil. Soc. 1870, 471.

Mullhypeneus maculatus, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 307.

I did not secure a specimen, but was told that a fish of this description is common among the reefs. Godet, in his "History of Bermuda," gives a description of color which is apparently taken from specimens by him, which renders the identification sufficiently certain. The species is also recorded from Cuba, Jamaica, Martinique, and Rio de Janeiro.

BERYCIDÆ.

HOLOCENTRUM SOGO, *Bloch.*

SQUIRREL.

Jaquaraca, MARCGRAVE, Hist. &c. Brasil, 1648, 147.

Perca marina rubra, CATESBY, Nat. Hist. Carolina, Florida, and the Bahama Islands, ii, 1743, 2., tab. ii, f. 2.

Bodianus pentacanthus, BLOCH, Ichth. vii, 1797, 29, tab. cccxxv (a badly-distorted copy of Marcgrave's figure).

Holocentrus sogo, BLOCH, op. cit. 46, tab. cccxxii.

Holocentrum sogho, GILL, Cat. Fish. E. Coast N. Am. 41, 186; and in Baird's Rep. on Sea Fisheries of South. New England, 1873, 804.

Holocentrus rubellus laminis branchiostegis serratis etc., BROWN, Hist. &c. Jamaica, 1799, 447.

Sogo holocentrus, SHAW, Gen. Zool. v. 1803, 555.

Bodianus jaguar, LACÉPÈDE, Hist. Nat. Poiss. &c. iv, 1803, 286.

Sciæna rubra, SCHNEIDER, Bloch, Syst. Ichth. 1801, 82 (not Forskål).

Holocentrum longipinne, CUV. & VAL., Hist. Nat. Poiss. iii, 1829, 181.—STORER, Syn. Fish. N. Am. 1846, 46.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 28.—COPE, Trans. Am. Phil. Soc. 1870, 465.

Common; its bright color and nervous darting motions rendering it one of the most conspicuous denizens of the rock-pools. It is found

throughout the West Indies and south to Brazil. Their voracity is very great, and the tyro in angling usually finds his first prize to be a "Squirrel." They are not often eaten. They breed plentifully about the islands, and reach a length of fifteen inches; the lobes of the vertical fins becoming proportionally more and more produced with age. The local name is the same as that given by Catesby, and refers to a grunting noise uttered by them, which resembles the bark of a squirrel.

The Cuban form seems to be nearly the same; but Professor Poey hesitatingly places it in a distinct species.

SCIÆNIDÆ.

GENUS PAREQUES, *Gill*, MS.*

PAREQUES ACUMINATUS, (*Schneider*) *Gill*.

CARRUB.

Grammistes acuminatus, SCHNEIDER, Bloch. Syst. Ichth. 1801, 184.

Eques acuminatus, CASTLENAU, Anim. Nouv. &c. Amérique du Sud, Poiss. 1855, 11.—

GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 280.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 370; Rep. Fis.-Nat. Cuba, ii, 1868, 325.—COPE, Trans. Am. Phil. Soc. 1870, 471.

Eques lineatus, CUV. & VAL., Hist. Nat. Poiss. v, 1830, 169.

Common here, though of rare occurrence elsewhere, having been observed only at Cuba, Santa Cruz, and Bahia; not valued for food. My specimens measure eleven inches. The name "Carrub" is inexplicable, unless it be a corruption of "Carp."

Color.—Tawny-yellow; extremities of fins and base of pectorals and ventrals blackish-brown; head blotched with the same. Two specimens have seven straight, longitudinal lines upon the side; the third is without any traces of such markings. Whether this difference is sexual, I have no means of determining. The first dorsal is one-fourth the height of the body, measured immediately below it.

* The genus *Pareques* is distinguished, according to Professor Gill, by the development of the spines of the first dorsal fin in normal number, (ten or eleven,) as well as other osteological characters.

SPARIDÆ.

CALAMUS MEGACEPHALUS, (*Swainson*) *Poey*.

GOAT'S HEAD PORGY.

Pagellus calamus, CUV. & VAL., Hist. Nat. Poiss. vi, 1830, 206, pl. 152.—POEY, Mem. Hist. Nat. Cuba, ii, 1861, 367.

Sparus calamus, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 308.

Calamus megacephalus, SWAINSON, Nat. Hist. Fish, ii, 1839, p. 222.—GUICHENOT, Mem. Soc. Imp. Sci. Nat. Cherbourg, xix, 1868, 112.—POEY, Ann. Lyc. Nat. Hist. x, 1874, 178.

Common; found also in the West Indies, reaching south to Bahia. My specimens measure from six to eighteen inches.

CALAMUS ORBITARIUS, *Poey*.

SHEEP'S-HEAD PORGY.

Pagellus orbitarius, POEY, Mem. Cuba, ii, 1860, 201; 1861, 367.

Sparus orbitarius, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 308.

Calamus orbitarius, POEY, Ann. Lyc. Nat. Hist., N. Y., x, 1874, 79.

Common; recorded also from Cuba. This species very closely resembles the preceding in form and habits, but is easily distinguished by the shortness of the snout, which gives it a very abrupt profile. In *S. calamus*, the diameter of the orbit is contained twice in the distance from the extremity of the snout to the perpendicular from the anterior border of the orbit; in *S. orbitarius*, once and one-half. The height of the two specimens before me is the same; and, in *S. calamus*, the height is contained in the length twice and three-quarters; in *S. orbitarius*, twice and one-half. The specimens measure sixteen and fifteen inches, respectively.

Color.—Both species, greenish-olive, with golden longitudinal stripes.

The names Goat's-head and Sheep's-head no doubt refer to the enormous pre-orbital bones which impart an ovine physiognomy to the fish. The Porgies are taken with the hook in large quantity, and rank among the most salable kinds. They live in deep water; and, when brought to the surface, their bellies are greatly expanded from the removal of pressure, giving them a very comical appearance.

SARGUS VARIEGATUS, (*Lacépède*,) *Goode*.

CHUB.

Sparus Sargus, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 278; ed. 12, 1, 1766, 469.—GMELIN, Linné, Syst. Nat. 1, 1788, 1270.—BLOCH, Ichth. viii, 1797, 31, tab. cclxiv.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 270.—LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 27, 77.—RISSE, Ichth. Nice, 1810, 236.

Sargus variegatus, LACÉPÈDE, op. cit. iv, 1803, 207 (from HAÜY, Encyclopédie Méthodique.)

Sargus raucus, GEOFFROY ST. HILAIRE, Descr. de l'Égypte, Poiss. 1813, pl. xviii, f. 1.

Sargus Rondeletii, CUV. & VAL., Hist. Nat. Poiss. vi, 1830, 14, pl. cxli.—VALENCIENNES, Webb & Berthelot, Hist. Nat. Canaries, Poiss. 1836, 28.—GUICHENOT, Expl. Scient. Algérie, Poiss. 1850, 46.—GÜNTHER, Cat. Fish. Brit. Mus. 1861, 44.

Very abundant; occurring in large schools in company with *Pimelepterus Boscii*, which it closely resembles in form and habits. It is strictly European, and is especially common in the Mediterranean, but has not been found west of Madeira and the Canaries. I have carefully compared Bermudian specimens with Mediterranean specimens in the Bonaparte collection labeled *Sargus Rondeletii*. The Chub is seined in vast quantities in Hamilton Harbor and other secluded bays. My specimens measure from ten to twelve inches.

PIMELEPTERIDÆ.

PIMELEPTERUS BOSCI, *Lacépède*.

BREAM.

Chaetodon cyprinaceus, BROUSSONET, MS.—GMELIN, Linné, Syst. Nat. 1, 1788, 1269, note *Pimelepterus Boscii*, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 429.—CUV. & VAL., Hist. Nat. Poiss. vii, 1831, 258.—VALENCIENNES, in Webb & Berthelot, Hist. Nat. Canaries, 1836, pl. xix.—DEKAY, Zool. N. Y. Fishes, 1842, 100, pl. xx, fig. 56.—STORER, Syn. Fish. N. A. 1846, 89.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 497.—GILL, Cat. Fish. E. Coast N. Am. 1861, 31.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 323.—GILL, in Baird's Rep. on Sea Fisheries of S. New England, 1873, 805.—BAIRD, Rep. Sea Fisheries of S. New England, 1873, 824.

Pimelepterus incisor, VALENCIENNES, op. cit. 805.

Common. The Bream is always found in company with the preceding species, to which it is very like in size, shape, and habits, and is taken with it in large numbers and brought to the market. It is easily distinguished from the Chub, as far as it can be seen under water, by the large black spot just behind the dorsal. It is also recorded from Madeira,

the Canaries, Jamaica, and Cuba. A single specimen was taken in the spring of 1873, at Staten Island, New York Harbor, by Mr. C. L. Copley, and sent by him to the Smithsonian Institution.

Color.—Golden-brown, with a longitudinal stripe of gold along the center of each row of scales, a silvery streak along the preorbital.

PRISTIPOMATIDÆ.

HÆMYLUM CAPEUNA, (*Lichtenstein*) Goode.

WHITE GRUNT.

Capeuna Brasiliensibus, MARCGRAVE, Hist. &c. Brasil, i, 1648, 155, f. 163.

Grammistes trivittata, SCHNEIDER, Bloch, Syst. Ichth. 1801, 188 (on Marcgrave's figure)

Serranus capeuna, LICHTENSTEIN, Abhandl. Berl. Akad. 1820-1, 288 (on Marcgrave's figure).

Hæmulon quadrilineatum, CUV. & VAL., Hist. Nat. Poiss. v, 1830, 288, pl. cxx.—STORER, Syn. Fish. N. Am. 1846, 75.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 316.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 319.—GILL, in Baird's Rep. Sea Fisheries of S. New England, 1873, 806.

Hæmulum quadrilineatum, COPE, Trans. Am. Phil. Soc. 1870, 471.

Hæmulon quinquelineatum, POEY, Mem. Hist. Nat. Cuba, ii, 1861, 419; Rep. Fis.-Nat. Cuba, i, 1867, 310; ii, 1868, 162.

Common, occurring in schools. My specimens measure four inches. Cuvier's description of the color is excellent; but Günther, in quoting it, fails to mention, either in generic or specific diagnoses, the brilliant red of the lips and mouth, which Cuvier thought of sufficient importance to found upon it his generic name *Hæmulon*. I have made use of the specific name *capeuna*, because it seems to have priority over that usually accepted. The name *trivittata* can scarcely stand, since it is not only inapplicable, but sure to mislead, as is evident from the two other names which have been given to the species, viz, *quadrilineatum* and *quinquelineatum*.

The species is recorded from Brazil, San Domingo, and Cuba.

HÆMYLUM CHRYSOPTERUM, (*Linné*) Cuvier.

MARGATE-FISH.

Perca marina gibbosa cinerea (Margate-fish), CATESBY, Hist. Carolina, Florida, and Bahamas, ii, 1743, 2, pl. ii, f. 1.

Perca chrysoptera, LINNÉ, Syst. Nat. ed. 12, 1766, 485.—GMELIN, Linné, Syst. Nat. 1, 1788, 1314.

Lutjanus chrysopterus, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 186, 226.

Hæmulon chrysopteron, CUV. & VAL., Hist. Nat. Poiss. v, 1830, 240—DEKAY, New York Fauna, Fishes, 1842, 85, pl. vii, f. 22.—STORER, Syn. Fish. N. Am. 1846, 75.—HOLLROOK, Ichth. South Carolina, 1855, 120, pl. xvii, f. 1.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 313.—GILL, in Baird's Rep. Sea Fisheries of S. New England, 1873, 806.

The Margate-fish of the fishermen is probably this species. It is common in summer, but was not to be found in the markets at the time of my visit. The species is recorded from the West Indies and Brazil. The fishermen recognize several others, as the Yellow, Streaked, Spotted, and Black Grunts, all of which probably belong to this family, if not to this genus.

LUTJANUS CAXIS, (*Schneider*) *Pocoy*.

GRAY SNAPPER.

Caxis, PARRA, Descr. Dif. Pie. Hist. Nat. Cuba, 1787, 14, lam. viii, f. 2.

Sparus Caxis, SCHNEIDER, Bloch, Syst. Ichth. 1801, 284.

Lutjanus Caxis, POEY, Rep. Fis.-Nat. Cuba, i, 1867, 269; ii, 1868, 293.—GILL, in Baird's Report on Sea Fisheries of S. New England, 1873, 806.

Bodianus Vivanet, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, pl. iv, f. 3 (on a figure by Plumier).

Sparus tetracanthus, BLOCH, Ichth. viii, 1797, 279, 930 (on a figure of Plumier).

Cichla tetracantha, SCHNEIDER, op. cit. 338.

? *Bodianus striatus* (*Fasciatus*), SCHNEIDER, op. cit. 335, tab. lxxv.

Lutjanus acutirostris, DESMAREST, Déc. Ichth. pl. ii, f. 1 (fide Cuvier).

Mesoprion griseus, CUV. & VAL., His. Nat. Poiss. ii, 1829, 471.—STORER, Syn. Fish. N. Am. 1846, 34.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 195.

Very common; distributed also throughout the Caribbean Sea and the Gulf of Mexico, and, according to Günther, who considers it identical with *Mesoprion goreensis* Cuv. & Val., extending east to the African coast. It breeds abundantly, and hundreds of individuals from four feet to four inches in length may be seen in almost any sheltered nook. It is one of the most delicious of food-fish, its flavor not unlike that of the Blue-fish (*Pomatomus saltatrix*). Its extreme cunning renders it very difficult to capture with either hook, pot, or grains, and has gained it the *soubriquet* of "Sea Lawyer". The market-name is "Gray Snapper".

Color.—Dark gray, changing but slightly in spirits.

The synonymy of this and the allied forms is much ensnarled, and a careful study of a full series of specimens is desirable.

LUTJANUS AYA, (*Bloch*) Gill.

YELTING; GLASS-EYED SNAPPER.

Acara aya, MARCGRAVE, Hist. &c. Brasil, 1648, 167.*Bodianus aya*, BLOCH Ichth. 1797, 33, tab. ccxxvii (on a figure by Prince Maurice).—

LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 286.

Mesoprion aya, CUV. & VAL., Hist. Nat. Poiss. ii, 1829, 457.—? GUICHENOT, Sagra's Hist.

Nat. Cuba, Poiss. 1845, 24.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 198.

Lutjanus aya, GILL, MS.*Bodianus ruber*, SCHNEIDER, Bloch, Syst. Nat. ed. 1801, 330.

Common. It probably breeds, as individuals of all ages occur; the largest weigh ten pounds or more, and are much esteemed as food. Its abrupt profile and large eyes give it a very sparoid appearance; to the latter feature it no doubt owes one of its popular names, a similar epithet being applied to the large-eyed *Stizostedium americanum*, the Wall-eyed or Glass-eyed Pike of the great lakes and the Mississippi Valley. The name "Yelting" is very puzzling.

Color.—Brilliant rose-red, fading in spirits to grayish-olive, with black blotch along the base of the soft dorsal; base of pectoral deep black.*

The species is peculiarly West Indian. Large specimens are sometimes brought in winter to the Washington market, in lots from Florida.

The Schoolmaster Snapper and Silk Snapper of the fishermen probably belong to this genus. The Spot Snapper and the Yellow-tail correspond doubtless to *Mesoprion uninotatus* (Cuv. & Val.) Gill, and to *Ocyurus chrysurus* (Bl.) Gill. *Lutjanus cynodon* (Cuv.) Gill probably also occurs. All these species are peculiarly West Indian.

SERRANIDÆ.

TRISOTROPIS UNDULOSUS, (*Cuvier*) Gill.

ROCK-FISH.

Perca marina venenosa punctata (Rock-fish), CATESBY, Nat. Hist. Carolina, Florida, and Bahamas, ii, 1743, 15, tab. xv.—CUV. & VAL., Hist. Nat. Poiss. ii, 1829, 386.

Serranüs undulosus, CUV. & VAL., op. cit. 295.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 143.

Trisotropis undulosus, GILL, Proc. Acad. Nat. Sci. Phila. 1865, 105.

Serranus brunneus, POEY, Mem. Hist. Nat. Cuba ii, 1860, 1314.

* Dr. Günther, in the "Synopsis of the Species", which serves as a key to the genus places this and the preceding species under the head "*aa. Ground-color olive, with a yellow, green, or brown shade.*" This is certainly very apt to mislead, and illustrates the difficulty of drawing correct ideas from the study of distorted and discolored museum-specimens.

Trisotropis brunneus, GILL, l. c.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 156, 234; Annals Lyc. Nat. Hist. N. Y. ix, 1870, 305.

Serranus arara, POEY (not CUV. & VAL.), Mem. ii, 1860, 132.

Serranus decimalis, POEY, Mem. ii, 1860, 138.

Serranus cyclopomatus, POEY, Mem. ii, 1861, 353; Rep. ii, 1868, 284.

Serranus latepictus, POEY, Mem. ii, 1861, 353.

Very common; recorded also from the West Indies and the coast of Brazil. The Rock-fish attains the length of four or five feet, and is one of the choicest of table-fishes, though Catesby declares that his "Rock-fish", which seems most probably the same, "has the worst character for its poisonous quality of any other among the Bahama Islands".

Color.—Brown, thickly mottled with large, irregularly quadrilateral spots of brownish-violet. The sides of the head are marked with wavy, irregular lines of deep violet. Dorsal broadly margined with black; caudal, anal, and ventral tipped with deep black, which gradually shades into the color of the body; pectorals tipped with orange.

It may be regarded as somewhat doubtful whether the species of Cuvier is identical with that whose diagnosis is given by Dr. Günther under the same name, since the former makes no allusion to the yellow tips of the pectorals. Professor Poey, after an examination of one of Cuvier's types, pronounces it distinct from his *Serranus brunneus* by reason of a slightly-rounded caudal. The *Serranus undulosus* defined by Günther coincides with Poey's *Serranus brunneus* in its truncated caudal and in other respects. I have provisionally accepted Günther's identification of Cuvier's species. Catesby's figure disagrees in its slightly-forked caudal, but in other respects corresponds with the specimen before me; and, since no conjecture has been offered as to its relations, I have, after making allowances for the carelessness which the artist manifests in many of the other plates, ventured to refer it to the same species.

TRISOTROPIS GUTTATUS, (*Schneider*) Gill.

RED ROCK-FISH.

Bonacé cardenal, PARRA, Descr. Dif. Piez. His. Nat. Cuba, 1787, 29, lam. xvi, f. 1.

Johnius guttatus, SCHNEIDER, Bloch, Syst. Ichth. 1801, 77 (on Parra's figure).

Trisotropis guttatus, GILL, Proc. Acad. Nat. Sci. Phila. 1865, 105.

Serranus cardinalis, CUV. & VAL., His. Nat. Poiss. ii, 1829, 378 (on Parra's figure).—

STORER, Syn. Fish., N. Am., 1840, 27.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 57, note 19.—POEY, Rep. Fis.-Nat. Cuba, i, 1867, 200.

Trisotropis cardinalis, POEY, op. cit. ii, 282; Annals Lyc. Nat. Hist. N. Y. ix, 1870, 303.

Serranus rupestris, CUV. & VAL., op. cit. ix, 1833, 437.—STORER, op. cit. 29.—GÜNTHER, op. cit. 145.

With some doubt I refer to this species the Red Rock-fish of the Bermuda market. In habits, form, and dimension, it much resembles the preceding. It is recorded from Saint Bartholomews, Cuba, and San Domingo, and at the latter place is called by the same name as in Bermuda.

EPINEPHELUS STRIATUS, (*Bloch*) *Gill*.

HAMLET; GROUPE.

Cherna, PARRA, Desc. Dif. Piez. Hist. Nat. Cuba, 1787, 50, lam. xxiv.

Anthias striatus, BLOCH, Ichth. ix, 1797, 109, tab. 324 (on a figure by Plumier).

Lutjanus striatus, LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 324.

Serranus striatus, CUV & VAL., Hist. Nat. Poiss. ii, 1829, 288.—STORER, Syn. Fish. N. Am. 1846, 27.—GUICHENOT, Sagra's Hist. Nat. Cuba, Poiss. 1850, 12.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 110.

Epinephelus striatus, GILL, Proc. Acad. Nat. Sci. Phila. 1865, 105.—POEY, Rep. Fis. Nat. Cuba, ii, 1868, 285.—COPE, Trans. Am. Phil. Soc. 1870, 466.

Anthias cherna, SCHNEIDER, Bloch, Syst. Ichth. ed. 1801, 310 (on Parra's figure).

Sparus chrysomelanurus, LACÉPÈDE, op. cit. 160. (on a bad copy of Plumier's figure).

Very common; found also throughout the Caribbean Sea and the Gulf of Mexico. The Grouper attains an enormous size; and, on account of its abundance and the ease of capturing, it is used as food more than any other species. Its flesh is rather inferior in flavor and coarse in texture, especially that of large individuals. Great numbers are caught off the islands, and are brought in the wells of the smacks to the artificial ponds along the shore, where they are kept for the market, and are fed on fish and lobsters.

The "Devil's Hole" is a large natural pool near the center of the main island, and about one hundred feet from the south shore of Harrington Sound. Here a large number of Groupers may usually be found confined, and the place is much visited by strangers. At feeding-time, when one looks into the clear waters of the pool, nothing can be seen but an array of great open mouths. When the food is thrown in, a scene of indescribable commotion and splashing ensues. They are very fierce, and rush savagely at anything which looks eatable. I have seen two large ones, each four feet in length, seize the opposite ends of a cuttlefish arm tugging for several minutes at the tough morsel before the question of ownership could be decided.

The young fish are called Hamlets; but, after reaching a length of eighteen or twenty inches, are known as Groupers; the latter name is a corruption of the Portuguese *Garoupa*, which is applied to a similar fish found at Madeira.

Color.—Adult fishes range from a light-slate color to a deep chestnut-brown. In some individuals a narrow band of black extends from the tip of the snout to a point between the eyes, where it divides; the branches extending, one to the origin of the dorsal and the other to the angle of the operculum, and upward to unite with the first at the origin of the dorsal. The lips and throat are bright vermilion.

A great variation is apparent in the color of different individuals, which has not yet been satisfactorily explained, though it is no doubt due to the depth of water or color of the bottom in the place where they are taken, as is suggested below under *Enneacentrus punctatus*. The fishermen claim that the color of individuals confined in the ponds changes from one extreme to the other within the period of a few weeks. I have myself seen very considerable variation in color in the course of a week in fishes confined in shallow fish-ponds. The young fish are always slate-color and are also marked with six or seven broad, transverse bands of light brown and a large quadrangular black blotch across the back of the tail behind the dorsal.

EPINEPHELUS GUTTATUS, (*Gmelin*) *Goode*.

HIND.

? *Cugupuguacu*, MARCGRAVE, Hist. &c. Brasil, 1648, 169.—SLOANE, Voyage aux Îles de Madère, des Barbades, de St. Christophe, et de la Jamaïque, 1727, tab. cexlvii.—*Cugupuguacu Brazil*, CATESBY, Nat. Hist. Carolina, Florida, and Bahamas, ii, 1743, 14, tab. xiv (the Hind).

Perca guttata, GMELIN, Linné, Syst. Nat. 1, 1788, 1315 (on a figure by Catesby).—CUV. & VAL., Hist. Nat. Poiss. ii, 1828, 372.

Bodianus apua, BLOCH, Ichth. vii, 1797, 37, tab. cexxix (on a figure by Prince Maurice).—LACÉPÈDE, Hist. Nat. Poiss. iv, 1803, 296.

? *Serranus apua*, CUV. & VAL., op. cit. 287 (citing as a synonym *Piratiapia*, MARCGRAVE, op. cit. 158).

Serranus apua, GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 140.

Bodianus marginatus, SCHNEIDER, Bloch, Syst. Ichth. 1801, 331.

Very common; recorded also from Jamaica, and probably from Brazil. The Hind is readily sold in the market, where specimens two feet in length are sometimes seen.

The name Hind perhaps refers to the spotted markings as similar to those of the deer. The name is found in nearly all the English West Indian islands, applied to the spotted species of this family.

Color.—Brownish, red, or rosy-white, with numerous small circular spots of deep rose-color, fading to brown in spirits. Vertical fins broadly margined with black.

The Hind is subject to great variations of color, specimens from the "white water", where there is a bottom of white sand, being nearly white, while others have the ground-color a dusky reddish-brown.

The descriptions of Gmelin and Bloch were both founded upon drawings, and their relations are somewhat doubtful. The former has been preferred, since the figure of Catesby agrees precisely with the Bermuda "Hind", except in the smaller number of dorsal spines, a matter of detail not likely to have been noticed by Catesby, judging from his other figures. The Bermudian form is much more likely to be identical with that from the Bahamas and Jamaica than that from Brazil, if, indeed, they are not all identical. Günther records from Jamaica his *Serranus apua*, which is, beyond a doubt, the Bermuda species, thus furnishing another argument for its identity with that figured by Sloane.

ENNEACENTRUS PUNCTATUS, (*Linné*) *Poey*.

BUTTER-FISH or CONEY (*yellow variety*); NIGGER-FISH (*red variety*).

Carauna, MARCGRAVE, Hist. &c. Brasil, 1648, 147.—LICHTENSTEIN, Abhandl. Akad. Berl. 1820-1, 278.

Perca marina puncticulata (Negro-fish), CATESBY, Nat. Hist. Carolina, Florida, and Bahamas, ii, 1743, 7, pl. vii.

Perca punctata, LINNÉ, Syst. Nat. ed. 10, i, 1758, 291; ed. 12, 1766, 485 (on Catesby's figure).

Enneacentrus punctatus, POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 288.

Guativere, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 7, lam. v, f. 1, 2.

Holocentrus auratus, BLOCH, Ichth. vii, 1792, 57, tab. ccxxxvi.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 314.

Gymnocephalus ruber, SCHNEIDER, op. cit. 346, tab. lxxvii (on a figure by Prince Maurice).

Serranus ouatalibi, CUV. & VAL., Hist. Nat. Poiss. ii, 1829, 381.—STORER, Syn. Fish. N. Am. 1846, 56.—GUICHENOT, Sagra's Hist. Nat. Cuba, Poiss. 1845, 15.—MÜLL. & TROSCH., Schomburgh's Hist. Barbados, 1848, 665.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 120.—POEY, op. cit. 202.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 446.

Epinephelus ouatalibi, GILL, Proc. Acad. Nat. Sci. Phila. 1865, 105.

Bodianus guativere, SCHNEIDER, Syst. Ichth. Bloch, 1801, 336 (on Parra's figures).

Serranus guativere, CUV. & VAL., op. cit. 383 (limited to Parra's f. 2).—STORER, l. c.—MÜLL. & TROSCH., l. c.—COPE, l. c.

Serranus carauno, CUV. & VAL., op. cit. 384 (on a drawing by Prince Maximilian).—CASTELNAU, Anim. Nouv. ou Rares, Amérique du Sud, Poiss. 1, pl. 1, fig. 1.

Common; recorded also from the West Indies, Brazil, and the Cape Verde Islands. Its small size and the softness of its flesh render it of little economic value. In this species, as in the preceding, the range of color is very great; some individuals are orange-yellow, with blue

spots confined to the head and anterior part of the body; others are red, slightly dingy above, and thickly studded throughout with black dots, each of which has a blue center. The specimens examined were not very fresh; and, from the rapidity with which the colors change, I can readily believe that in life they were as brilliant as is indicated in the description of Cuvier.* The yellow form corresponds to the typical *Perca punctata* or *Serranus quativere*, and is known as the Butter-fish or Yellow Coney; the red form corresponds to *Serranus ouatalibi*, and is known as the Nigger-fish.

Professor Poey suggests that the former inhabits shallow and the latter deep waters, and thus explains the variations of color. These would seem, however, to depend more upon the color of the bottom than upon the depth. On the coast of Maine, the bright-red variety of the Cod (*Gadus morrhua*, Linné) is found only on bottoms covered with Red Algæ, such as *Ptilota serrata*, *Delesseria sinuosa*, and *Rhodymenia palmata*.

The names Butter-fish and Nigger-fish are in use also at Barbados, Saint Thomas, and the Bahamas, as applied to this and an allied species. The first refers to the color and soft, oily feeling of the yellow variety; the latter probably also to color.

The Black Hind, Prickly Hind, and Black Coney are probably allied species, but not having seen them I can only surmise their character.

A "Soap-fish" also occurs, probably either *Rhypticus saponaceus* (Bloch) Cuvier, or *Promicropterus maculatus* (Holbrook) Gill.

HYPOPLECTRUS PUELLA, (Cuvier) Gill.

CATAPHEBE.

Plectropoma puella, CUV. & VAL., Hist. Nat. Poiss. ii, 1829, 405, pl. xxxvii.—GUICHENOT, Sagra's Hist. Nat. Cuba, Poiss, 1845, 18.—STORER, Syn. Fish. N. Am. 1846, 31.—POEY, Mem. Hist. Nat. Cuba, i, 1852, 62, lam. ix, f. 2.—GÜNTHER, Cat. Fish. Brit. Mus. i, 1861, 165.

Hypoplectrus puella, GILL, Proc. Acad. Nat. Sci. Phila. 1862, 236.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 290.

Plectropoma vitulinum, POEY, Mem. Hist. Nat. Cuba, i, 1852, 68.

Common in the rock-pools; recorded also from Martinique and Jamaica. My specimen measures three inches. The name seems to be peculiar to Bermuda, and its origin is not apparent.

Color.—Olive, with six violet-black cross-bands; the third very broad and conspicuous and below the fourth and tenth dorsal spines. A line

* Cuvier and Valenciennes, Histoire Naturelle des Poissons, ii, 381

around the orbit, another from posterior nostril across anterior edge of orbit to lower limb of preoperculum, then broken, then continued to base of ventral; and two others across the operculum; the anterior extending over the base of pectoral to belly, blue. Several blue spots between the orbit and snout. Fins yellowish.

ECHENEIDIDÆ.

Fishes of this family are frequently taken, clinging to sharks or to the shells of turtles.* The sharks thus encumbered are frequently much emaciated. *Leptecheneis naucrates* (Linn.) Gill, *L. naucrateoides* (Zuiew) Gill, and *Ptheirichthys lineatus* (Menz.) Gill are probably the most common species of "Suck-fish" found here.

SPHYRÆNIDÆ.

SPHYRÆNA SPET, (*Haüy*) Goode.

BARRACUDA.

Esox dorso dipterygio LINNÉ, Mus. Ad. Fried. ii. 1754, 100.

Esox sphyraena, LINNÉ, Syst. Nat. ed. 10. i, 1758, 313, ed. 12; i, 1766, 115; GMELIN, Linné, Syst. Nat. i, 1788, 1389.—BLOCH, Ichth. xi, 1797.

Sphyrna sphyraena, BLOCH, Ichth. 1797, taf. cccxxxix.—SCHNEIDER, Bloch, Syst. Ichth. 1801, 109.—Risso, Ichth. Nice, 1810, 332.

Esox spet, HAÜY, Encyclopédie Méthodique, iii, Poissons, 7187.

Sphyræna spet LACÉPÈDE, Hist. Nat. Poiss. v, 1803, 326-8.—? BONAPARTE, Iconografia della Fauna Italica, iii, Pesci, plate with part 152.

Sphyræna becuna, LACÉPÈDE, op. cit. 327-9, pl. ix, f. 1.—CUV. & VAL., Hist. Nat. Poiss. iii, 1829, 340 (part); and vii, 1831, 507.

Sphyræna vulgaris, CUV. & VAL., op. cit. iii, 1829, 327.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 334.

Sphyræna viridensis, CUV. & VAL., sc., op. cit. 339.

Common; frequently found in the markets, and eaten with impunity, as far as I could learn. My specimens measured nearly two feet, and it is said to attain a much greater size. This is not the Barracuda of the West Indies, but the common species of the Mediterranean known by the Spanish as *Espeto* and by the Italians as *Sfirena* and *Luzzo*. Its occurrence so far west has, I believe, never before been observed. Günther

* All four species of the pelagic turtles of the Atlantic are common, and were observed by me, viz:—*Sphargis coriacea*, *Chelone mydas*, *Eretmochelys imbricata*, and *Thalassochelys caouana*. These, with a small saurian, *Eumeces longirostris*, Cope, make up the reptilian fauna of the Bermudas.

considers the *Sphyræna borealis* of DeKay,* described from specimens eight inches long taken in New York Harbor, to be the same. This might be inferred from the somewhat loose language of the description; but the figure shows it to be closely allied to, if not identical with, *Sphyræna picuda*. The origin of the first dorsal is shown by the artist to be situated almost directly above the extremity of the pectorals and far in front of the middle of the fish. The locality, New York, given by Dr. Günther for his specimen "purchased of Mr. Brandt" must, I fear, be placed in the same category with that of Lake Champlain given for specimens of *Chilomycterus geometricus* and *Tetrodon turgidus*,† and with some of the cases of reptiles described as North American by Duméril and Bibron from collections professedly North American.

SPHYRÆNA PICUDA, *Schneider*.

SENNET.

Barracuda, SLOANE, Voyage aux îles de Madère et de la Jamaïque, ii, 1727, 185, pl. ccxlvii, f. 3.

Umbla minor marina maxillis longioribus (*Barracuda*), CATESBY, Hist. Carolina, Florida, and the Bahamas, ii, 1743, 1, tab. 1.

Picuda, PARRA, Descr. Dif. Piez. Hist. Nat. Cuba, 1787, 90, lam. xxxv, f. 2.

Sphyræna sphyræna, var. *picuda*, SCHNEIDER, Bloch, Syst. Ichth. ed. 1801, 110, tab. xxix, f. 1.—MÜLLER & TROSCHEL, Schomburgk's Hist. Barbados, 1848, 667.—GÜNTHER, Cat. Fish. Brit. Mus. ii, 1861, 336.

Esox barracuda, SHAW, Gen. Zool. v, 1804, 105.

Sphyræna barracuda, CUV. & VAL., Hist. Nat. Poiss. iii, 1829, 343, pl. lxvi.—STORER, Syn. Fish. N. A. 1846, 47.—MÜLLER & TROSCHEL, l. c.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 472.

Common; breeding plentifully. The young may be seen basking in the sun in the shallows, where they are seined in large numbers. My largest specimens measured over two feet in length. Both this and the preceding species are eaten with impunity, though the former is regarded with suspicion on the Mediterranean and the latter has to answer for several well-attested cases of *ciguatera*, though in some of the West India Islands it is eaten freely.

The popular name is also in use at Barbados, where it is applied to the same or an allied species. Schomburgk spells it *Sinnet*.

The species of this genus are not yet very accurately defined. Professor Cope‡ takes exception to the supposed identity of *S. picuda* and

* Zoology of New York, Fishes, 39, pl. lx, f. 196.

† Cat. Fish. Brit. Mus. viii, 285.

‡ Proc. Amer. Phil. Soc. Phila. 1870, 472.

S. barracuda. The latter may be easily distinguished from the preceding by observing the situation of the first dorsal. In *S. spet*, this begins in the middle of the body and far behind the extremity of the pectorals; in *S. picuda*, on the anterior half of the body and above the extremity of the pectorals. The first is much the slenderer, and has nearly double the number of scales in the lateral line.

TRACHYPTERIDÆ.

REGALECUS GLADIUS, (*Walbaum*) *Cuv. & Val.*

Spada marina, IMPERATI, 587.

Cepola gladius, WALBAUM, Artedi Gen. Pisc. iii, 1792, 617.

Regalecus gladius, CUV. & VAL., Hist. Nat. Poiss. x, 1835, 352, pl. ccxcviii—GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 308.—HUTTON, Fishes of New Zealand, 35.

Gymnetrus longeradiatus, RISSO, Hist. Nat. Eur. Merid. iii, 1827, 296.

? *Gymnetrus capensis*, CUV. & VAL., op. cit. 376.

Regalecus Jonesii, NEWMAN, Zoologist, 1860, 7019.

This is the great "Sea-serpent" which came ashore at Hungary Bay in the winter of 1860, the capture of which has been recorded by Mr. J. Matthew Jones.*

Portions of this specimen, which measured 16 feet and 7 inches in length, are preserved in the British Museum.

This specimen is thought by Günther to "probably belong" to the species given above. The well-identified specimens of the species are all from the Mediterranean, the largest 9½ feet long, while the relations of the specimens from New Zealand and the Cape of Good Hope are conjectural. The data are not sufficient to warrant the adoption of Newman's species, founded on the Bermuda specimen as a good one.

MUGILIDÆ.

MUGIL LIZA, *Valenciennes*.

MULLET.

Mugil liza, CUV. & VAL., Hist. Nat. Poiss. xi, 1836, 86.—JENYNS, Zool. Voyage H. M. S. Beagle, Fish, 80.—GÜNTHER, Cat. Fish. Brit. Mus. iii, 1861, 423.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 388

Very common, especially in Hamilton Harbor and other shallow bays; breeding. They are seined, and brought to market in large numbers.

* Bermuda Royal Gazette, Jan. 24 and Jan. 31, 1860.—Proc. Zool. Soc. London, 1860, 185.

I have some hesitation in referring the Bermuda Mullet to this species, though it appears to be identical with that taken at Bahia Blance and Monte Video by Darwin and described by Jenyns.* Poey considers his *Mugil lebranchus*† separated from this species by characters of doubtful value.

BELONIDÆ.

The Hound-fish of the fishermen is a *Belone*; but as I could get no specimens for careful examination, it is not possible to say to which of the nineteen West India species it belongs, or whether two or three species are not confounded under the same name.

SCOMBERESOCIDÆ.

HEMIRHAMPHUS PLEII, Valenciennes.

GAR-FISH.

Hemirhamphus Pleii, CUV. & VAL., Hist. Nat. Poiss. xix, 21, 1846.—GÜNTHER, Cat. Fish. Brit. Mus. vi, 268.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 481.

Common; recorded also from various points in the West Indies and from Bahia. The Gar-fish occurs in enormous schools, and is seined in quantity for the market. I observed two sizes, the smallest averaging eight inches, the larger twenty inches. The fish of different sizes swam in separate schools.

The name *Gar*, applied so indiscriminately to fishes with long slender beaks, is probably the old Saxon word *gar*, which means a weapon, a lance. The name Half-beak usually given to fishes of this family is much more appropriate.

EXOCÆTUS EXILIENS, Gmelin.

Exocætus exiliens, GMELIN, Linné, Syst. Nat. 1, 1788, 1400.—CUV. & VAL., Hist. Nat. Poiss. xix, 1846, 114.—RICHARDSON, Fauna Boreali-Americana, iii, 129.—GÜNTHER, Cat. Fish. Brit. Mus. vi, 1861, 291.—GILL, in Baird's Rep. on Sea Fisheries of Southern New England, 809.

Exocætus fasciatus, LESUEUR, Journ. Acad. Nat. Sci. Phila. ii, 1821, 8, pl. iv, f. 2.

A single specimen was brought me March 1 by some negro fishermen who had caught it in Hamilton Harbor by holding a tin pail ("kettle") under it when it leaped from the water. I kept it alive for some hours,

* Zool. Voyage H. M. S. Beagle, Fish, 1842, 80.

† Memorias sobre la Historia Natural de la Isla de Cuba * * * ii, 1861, 260, tab. 18, f. 3; Rep. Fis.-Nat. Cuba, ii, 1868, 388.

and had an opportunity to observe its motions. Its favorite position was on the bottom of the dish, where it would remain with its pectorals and ventrals widely expanded, looking very like a large butterfly sunning itself on a flower. When disturbed, it would fold its fins close to the sides of its body, and swim about with great velocity by rapid, long, sweeping strokes of the tail and posterior half of the body. The extent to which it flexed its body was quite remarkable, almost reminding one of the motions of a Shark. When much excited, it would rise into the air with a sudden spring, its pectorals and ventrals expanded, seeming to have no difficulty in leaving the water in a space less than a foot in diameter: I am inclined to believe that the impetus from the action of the caudal is all that is used in leaving the water, and that the motion of the pectorals in flying-fishes is not begun until the fish is fairly in the air. It seemed very timid and watchful, and any quick motion of the hand within its sight would start it into rapid, nervous action.

The figures given by Lesueur and Edwards* are very accurate; but all published descriptions fail to mention the most striking character, viz, the deep notch in the membrane between the second and third pectoral rays, which seems the more apparent from the fact that the second ray is longer than the third, and projects in a spine-like process; the membrane between the third and fourth rays is slightly emarginate. The fourth ray is much the longest and the rays posterior to that regularly decrease in length.

The Bermuda fishermen recognize two kinds of flying-fish, the pelagic variety and this, which they believe to live among the sea-weed and seldom leave the water. The specimens of this species on record are all quite small: Gmelin describes his as "*at vix digito longior*"; Lesueur's was three inches long; Valenciennes's was "*petite*"; and Edwards's figure indicates that his was diminutive. They may prove to be the young of some other species; but this is not probable, since no other form has pectorals of such peculiar form. The absence of barbels, if this be a character of immature *Exocoetidae*, is also noteworthy.

A detailed description is given below:—

Radial formula: D. 12; A. 12; P. 18; V. 6; L. lat. 48.

The body is slender, its height being less than one-eighth (0.12) of the total length. Viewed from above, its outline is that of a narrow wedge, with its base at the nape and its apex at the extremity of the lower caudal lobe. The greatest width of the body is at the nape, where it is

* Gleanings in Natural History, pl. cex.

equal to the greatest height, which occurs at the same point. The length of the head is one-sixth (0.17) of total length, and its greatest width equals that of the body. The orbit is circular, and its diameter equals the interorbital space, which is half the length of the head. The snout is very short, equaling one-sixth the length of the head; the lower projects far beyond the upper jaw. The interorbital space is deeply concave. The dorsal and anal fins begin at a point slightly behind the middle of the body, and are nearly alike in shape and in the length of the base and of the longest rays. The pectorals measure three-fifths (0.58) of the total length, extending nearly to the base of the caudal fin. The first ray is half as long as the second, which projects far beyond the margin of the membrane in a spine-like process; the third ray equals the second, while the fourth is much longer. The membrane between the second and third rays is deeply, between the third and fourth slightly, emarginated. The rays succeeding the fourth gradually decrease in length. The ventrals begin slightly in advance of the middle of the body, in length equaling a third (0.31) of total length. The five posterior rays are bifid nearly to the base. The tips of ventral and pectoral fins are equidistant from the snout. The upper lobe of the caudal measures two-thirds the length of the lower lobe.

Color.—Back bluish, shading into the silvery white of the belly; five broad lateral transverse bands. The snout transparent white. Two yellow spots upon the nape. Pectorals and ventrals black at base and at margin, and with broad, irregular bands and blotches of black and dark blue; where unspotted, clear, colorless, and transparent. Caudal lobes each with a terminal spot of black; the lower with spot of same color on its outer margin half-way from the body to its extremity.

Extreme length, 0 ^m .073	100
Body:	
Greatest height	.12
Greatest width.....	.12
Height at ventrals	.10
Height of tail behind dorsal fin	.06
Head:	
Length	.17
Distance from snout to nape.....	.15
Greatest width.....	.12
Width of interorbital area.....	.10
Length of snout.....	.03
Eye:	
Diameter	.08

Dorsal:

Distance from snout.....	.56
Length of base.....	.13
Greatest height	.13

Anal:

Distance from snout.....	.56
Greatest height	.14

Caudal:

Length of upper rays.....	.15
Length of lower rays.....	.23

Pectoral:

Distance from snout at upper axilla	.16
Length	.58
Distance of tip from snout.....	.80

Ventral:

Distance of base from snout.....	.45
Length	.32
Distance of tip from snout.....	.78

The *Exocoetus exiliens* of Bloch is totally different.

I observed numerous specimens of the pelagic species in the vicinity of the islands, both on going and return. I take from my note-book some observations on their flight.

“February 10, 1871.—Several flying-fishes were observed on approaching the islands; usually they were single, but often a school of half a dozen or more started out from under the side of the brig. The distance of flight varied from six to one hundred yards. When they leave the water, the pectorals assume a rapid vibration, reminding one of the flight of a grouse, the tail also rapidly vibrating. The fins soon assume a rigid position, and the fish rises over the crests and falls in the trough of the waves, following their motion; sometimes it dashes through the crest, and on re-appearing the fins are again in motion. They seem unable to fly except in a straight line (I afterwards saw them veering considerably from a straight line, taking a direction nearly at right angles with their first course), but are not dependent on the direction of the wind. The motion is very bird-like, but the illusion is dispelled by the decidedly piscine splash with which the fish plunges into the water. It was a truly beautiful sight as the fishes emerged from the waves, their silvery fins quivering and glistening in the light.”

I am convinced that at the moment the fish leaves the water the mode of propulsion changes from a true swimming motion to a true flying motion. The leap with which it leaves the water is due to the former, and is analogous to the spring from the ground or from a perch, made by some birds in the act of taking wing.

CYPRINODONTIDÆ.

FUNDULUS BERMUDÆ, *Günther*.

Fundulus Bermuda, GÜNTHER, Ann. & Mag. Nat. Hist., 1874.

Very common in the brackish water of the swamps and in ditches. Attains the length of four inches.

SYNODONTIDÆ.

SYNODUS LACERTA, (*Valenciennes*) *Goode*.

SNAKE-FISH.

Salmo Saurus, LINNÉ, Syst. Nat. 2 ed. 11, 511, 1766; Gmelin, Syst. Nat. 1, 1376.

Saurus lacerta, CUV & VAL., Hist. Nat. Poiss. xxii, 463, 1849 (not Risso).

Saurus griseus, LOWE, Trans. Zool. Soc. ii, 188, 1841.—GÜNTHER, Cat. Fish. Brit. Mus. v, 395.

A specimen, seventeen inches long, was taken off the "ducking-stool" in March, by a line fisherman. Its occurrence in this part of the Atlantic is very novel, but it agrees closely with a specimen of *Saurus griseus* sent to the United States National Museum by Dr. Günther. Its color was dusky-gray above, yellow below. Its formulæ are as follows:—

Branchiostegals, 16–17 (on opposite sides). D. 12; A. 12. Lateral line, 60. Transverse line, $\frac{3\frac{1}{2}}{6}$.

ELOPIDÆ.

MEGALOPS THRISOIDES, (*Bloch*) *Günther*.

TARPUM.

Camaripucuagu, MARCGRAVE, Hist. &c. Brasil, 1648, 179.

Clupea cyprinoides, BLOCH, Ichth., xii, 1797, 24, tab. cccciiii.

Clupea thrissoides, SCHNEIDER, Bloch, Syst. Ichth. 1801, 424.

Megalops thrissoides, GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 472.—GILL, in Baird's Rep. on Sea Fisheries of Southern New England, 1873, 810.

Clupea apalike, HAÜY, Encyclopédie Méthodique.—LACÉPÈDE, Hist. Nat. Poiss. v, 1803, 425, 461.

Clupea gigantea, SHAW, Gen. Zool. v, 1803, 173.

Megalops atlanticus, CUV. & VAL., Hist. Nat. Poiss. xix, 1846, 398.—MÜLLER & TROSCHEL, Schomburgk's Hist. Barbados, 1848, 676.—POEY, Rep. Fis.-Nat. Cuba, ii, 1868, 423.

Extremely rare; a single skin about six feet long was shown me in the collection of John T. Bartram, of Saint George's. The species

is recorded from the Gulf of Mexico, Demerara, Trinidad, Guadaloupe, Santo Domingo, Porto Rico, Martinique, and Cuba.

The species is very abundant on the eastern coast of Florida and in the Saint John's River, where it is known as the Jew-fish. Several specimens were taken on the southern coast of New England and New York in 1874.

The name is inexplicable, but may have some connection with the name "Caffum", which is given to the same fish in Barbados.

CLUPEIDÆ.

SARDINELLA ANCHOVIA, *Valenciennes*.

ANCHOVY.

Sardinella anchovia, CUV. & VAL., Hist. Nat. Pois. xx, 1847, 269.

Clupea anchovia, GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 421.

I refer with some doubt to this species a small fish which occurred in great schools during the month of March, and were seined together with *Decapterus punctatus*, and sold in quantities along the quay. Their average length was about five inches.

HARENGULA MACROPHTHALMA (*Ranzani*).

PILCHARD.

Clupea macrophthalma, RANZANI, Novi Commentarii Acad. Scient. Inst. Bononiensis, v, 1842, 320, tab. xxiii.—GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 421.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 483.

Harengula sardina, POEY, Mem. Hist. Nat. Cuba, ii, 1863, 310; Rep. Fis.-Nat. ii, Cuba. 1868, 418.

Common; also recorded from various islands in the West Indies. Great quantities were seined during the month of March, and sold from row-boats at the water's edge. Their average length was nine inches. Poey's *Harengula sardina* appears to be the same. The name is derived from England, where an allied species, *Clupea pilchardus*, Walbaum, is commonly known as "the Pilchard".

OPISTHONEMA THRISSA, (*Linné*) *Gill*.

HERRING.

Clupea minor, radio ultimo pinnæ dorsalis longissimo, BROWN, Civ. and Nat. Hist. Jamaica, 1756, 443.

? *Clupea corpore ovato*, LINNÉ, Amœn. Acad. v, 251.

Clupea thrissa, LINNÉ, Syst. Nat. ed. 10, 1, 1758, 318; ed. 12, 1, 1750, 524; GMELIN, Linné, Syst. Nat. 1, 1788, 1405 (part).—BROUSSONET, Ichth. 1, tab. x.—?BLOCH, Ichth. xii, 1797, 27, taf. ccciv (from a drawing by Plumier).—SCHNEIDER, Bloch, Syst. Ichth. ed. 1801, 424.—GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 432.

Meletta thrissa, CUV. & VAL., Hist. Nat. Poiss. xx, 1847, 380.

Opisthonema thrissa, GILL, Proc. Acad. Nat. Sci. Phila. 1861, 37; Cat. Fish. E. Coast N. Am. 1861, 54; and in Baird's Rep. on Sea Fisheries of S. New England, 1872, 811.

Opisthonemus thrissa, POEY, Rep. Fis. Nat. Cuba, ii, 1886, 419.

Clupanodon thrissoides, SPIX, MÜLL., & TROSCH., Schomburgk's Hist. Barbados, 1848, 676.

Megalops thrissoides, AGASSIZ, in Spix's Selecta Gen. et Spec. Pisc. Brazil, 1829, 45, pl. xxii.

Megalops oglina, LESUEUR, Journ. Acad. Nat. Sci. Phila. 1, 1817, 359.

Chatoessus oglina, GRIFFITH, Cuvier's Animal Kingdom, x, 1835, 439.—DEKAY, New York Fauna, Fishes, 1842, 265.—STORER, Syn. Fish. N. Am. 1846, 209.

Chatoessus signifer, DEKAY, op. cit. 264, pl. xli, f. 132.—STORER, op. cit. 210.—BAIRD, Fishes of New Jersey Coast, 1855, 35.—JONES, Naturalist in Bermuda, 103.

Chatoessus eumorphus, GOSSE, Naturalist's Sojourn in Jamaica, 1851, 290 (notes).

This species was taken in great numbers during the month of March. They occurred in schools in two distinct sizes; the smaller, perhaps the young of the previous year, measured four inches on an average; the adults, ten. The species is common in the West Indies, and has been taken as far north as Newfoundland.

ENGRAULIDIDÆ.

ENGRAULIS CHÆROSTOMUS, Goode.

HOG-MOUTH FRY.

Engraulis chærostomus, GOODE, Amer. Journ. Science and Arts, viii, 1874 (Aug.), 125.

Common in the bays in large schools; used extensively for bait. Its enormous mouth has given it the name of "hog-mouth fry."

This species closely resembles *Engraulis surinamensis* (Blkr.) Günther, differing from it, however, in several respects. The height of the body (0.16) is a little greater than two-thirds of the length of the head, and is contained six times in the total length, and slightly more than four times in the length to the end of middle caudal rays (0.90); the height at the ventrals is less (0.13). The scales are large, in thirty-eight oblique rows between the head and the caudal. The length of the head (0.22) is less than one-fourth of the total, and is double its height at the pupil (0.11); its greatest width (0.08) is about one-third of its

length. The orbit is nearly circular, and its diameter (0.05) equals the length of the snout (0.05) and the width of the interorbital area (0.05). The snout projects far beyond the lower jaw, the extremity of which just passes the vertical from the anterior margin of the orbit. The maxillary is dilated above the mandibular joint, rather tapering behind, and extends to the gill-opening. The gill-rakers are fine, setiform, not longer than the eye (0.05); about twenty-five on the lower branch of the outer branchial arch.

The origin of the dorsal fin is in front of the middle of the body (0.45 from the snout), and directly above the extremities of the ventrals. The length of the first ray (0.06) is half that of the second (0.12), which nearly equals the length of the base (0.11). The origin of the anal is at the middle of the body (0.51 from the snout), and below the posterior dorsal rays; its greatest height (0.11) nearly equals that of the dorsal. The length of the middle caudal rays (0.08) is two-fifths of that of the outer rays (0.20). The length of the pectorals (0.11) equals the length of the base of the dorsals (0.11), the extremities reaching to the origin of the ventrals. Length of ventrals, 0.09; and their distance from snout, 0.35.

Color:—Back and sides brownish; belly white; a broad, clearly-defined lateral band of silver as wide as the diameter of the orbit (0.05).

Radial formula:—D. 13-14, A. 23-24. Length, 2.68 inches (0^m.63).

CYPRINIDÆ.

CARASSIUS AURATUS, (*Linné*) *Bleeker*.

GOLD-FISH.

Cyprinus auratus, LINNÉ, Syst. Nat. ed. 10, i, 1758, 323.—JONES, Naturalist in Bermuda. 1863, 103.

Carassius auratus, BLEEKER, Cyprin. 255.—GÜNTHER, Cat. Fish. Brit. Mus. vii, 1868, 32,

Common in the brackish water of the ditches. Mr. Jones states that it was introduced from Demerara many years ago.

ANGUILLIDÆ.

ANGUILLA BOSTONIENSIS, (*Lesueur*) *Ayres*.

EEL.

Muraena bostoniensis, LESUEUR, Journ. Acad. Nat. Sci. Phila. i, 1817, 81.

Anguilla bostoniensis, AYRES, Boston Journ. Nat. Hist. iv, 1842, 279.—GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 31.—GILL, in Baird's Rep. Sea Fisheries Southern New England, 1873, 811.—BAIRD, Rep. Sea Fisheries Southern New England, 1871, 826.

Common in the ditches and dikes of the salt-marshes. Mr. Jones states* that it attains the weight of two or three pounds, and is very destructive to young ducklings. It is not eaten.

I obtained a specimen measuring five inches, which I refer with some hesitation to the above species, as measurements made from specimens contracted by strong alcohol are not satisfactory. The length of the head is contained once and a half in the distance between the gill-opening and the dorsal, twice in the distance between the gill-opening and the vent. The distance between the origins of the dorsal and anal is contained once and a half in the length of the head.

MURÆNIDÆ.

GYMNOTHORAX MORINGA, (Cuvier) Goode.

SPECKLED MARAY.

Muræna maculata nigra (Black Murey), CATESBY, Nat. Hist. Carolina, Florida, and Bahamas, ii, 1743, 21, tab. 21, 174.

Muræna moringa, CUVIER, Règne Animal, 1817.—STORER, Syn. Fish N. Am. 1846, 235

Muræna moringua, RICHARDSON, Voy. H. M. S. S. Erebus & Terror, Ichth. 1846, 89.—KAUP, Cat. Apod. Fish. Brit. Mus. 1856, 89.

Gymnothorax rostratus, AGASSIZ, in Spix's Selecta Gen. et Spec. Brasil, 1829, 91, tab. 1, a.—MÜLL & TROSCH., Schomburgk's Hist. Barbados, 1848, 676.—POEY, Rep. ii, 1860-1, 259, 427.—COPE, Trans. Am. Phil. Soc. Phila. 1870, 483.

Murenophis rostratus, CASTELNAU, Anim. Nouv. ou Rares, Amérique du Sud, 1855, 80, pl. xlii, f. 1.

Murenophis curvilineata, CASTELNAU, op. cit. 81, pl. xlii, f. 2.

Occasional: the species occurs throughout the West Indies, at Bahia and at Saint Helena. My specimen measures three feet, and has the vertical fins edged with white. These fishes are said to attain a length of five or six feet, and are considered excellent food by the lower classes: I am told, however, that serious cases of poisoning have been occasioned by their use. The Speckled Maray is not rare, but by no means as common as the Green Maray. I saw a single specimen of the latter, but as I could not obtain it for study I was unable to determine its specific relations. It resembles closely the "Muray" of Catesby,† which I have reason to believe is not identical with his "Black Muray", as is generally supposed.

* Naturalist in Bermuda, p. 103.

† Nat. Hist. Carolina, Florida, and Bahamas, 20, pl. xx—*Muræna maculata nigra* and *viridis*.

ECHIDNA CATENATA, (*Bloch*) *Bleeker*.

Gymnothorax catenatus, BLOCH, Ichth. xii, 1797, 69, taf. ccccxv.

Muraena catenata, RICHARDSON, Voyage H. M. S. S. Erebus & Terror, Ichth. 1846, 95.—

GÜNTHER, Cat. Fish. Brit. Mus. viii, 1870, 131.

Pæcilophis catenatus, KAUP, Cat. Apod. Fish. Brit. Mus. 1856, 100.

Echidna catenata, BLEEKER, Ned. Tyds. Dierk. ii, 242.

Dr. Kaup (*l. c. sup.*) gives Bermuda as a locality for this species; it also occurs at many of the West India Islands, at Trinidad, and on the coast of Dutch Guiana at Surinam.

RAIÆ.

The names Sting Ray and White Ray would indicate the occurrence of one or more species of this order. *Ætobatis narinari* (Euphrasen) Müll. & Henle is likely to occur here.

LAMNIDÆ.

Mr. Jones records a specimen nearly eight feet long taken in March, 1850, which he believes to be the *Lamna punctata* figured by DeKay.*

SPHYRNIDÆ.

The Hammer-head Shark known to the fishermen is probably the *Sphyrna zygaena* (Linné) Müller & Henle.

SCYLLIIDÆ.

The large Shark confined in the Devil's Hole is probably *Ginglymostoma cirratum* (Gmelin) Müll. & Henle.

GALEORHINIDÆ.

MUSTELUS CANIS, (*Mitch.*) *DeKay*.

NURSE SHARK.

Squalus canis, MITCHILL, Trans. Lit. and Phil. Soc. N. Y., 1, 486, pl. lxiv, f. 209.

Mustelus canis, DEKAY, Zool. N. Y. Fish, 1842, 355, pl. lxiv, f. 209.—STORER, Syn. Fish.

N. Am. 253.—BAIRD, Fishes New Jersey Coast, 39, 1854; Rep. U. S. Com. Fish,

1871, 827.—GILL, Cat. Fishes E. Coast N. Am. 59; and in Baird's Rep. U. S.

Com. Fish, 1871, 813.—POEY, Rep. Fis.-Nat. Cuba, ii, 453.

Common. My specimen measured three feet, and one of the oviducts contained a young one eight inches long. It agrees exactly with specimens of *Mustelus canis* from Wood's Hole, Mass.

The Nurse is considered excellent food; after it has been boiled until tender, and then fried in its own fat. The sharks are rarely eaten, however, except by the negroes.

* Zoology of New York, Fish, 352, pl. lxiii, f. 206-207.

APPENDIX.

ADDITIONAL SPECIES OBSERVED BY MR. J. MATTHEW JONES.

After the preceding pages were in type, I received from Mr. Jones a list of the species collected by him in the Bermudas. In order to represent as fully as possible the present state of knowledge in reference to the fish fauna of these islands, I venture to give below the names of those species cited by Mr. Jones which have not fallen under my personal observation. Many species are of course included both in his collection and my own. The specific names below are given on the authority of Mr. Jones, who employs the nomenclature of Dr. Günther's "Catalogue of the Fishes in the British Museum".

LIST.

Diodon maculatus.	Platyglossus bivittatus.
Tetrodon rostratus.	Glyphidodon cælestinus.
Ostracion trigonus.	Acanthurus chirurgus.
Balistes maculatus.	Chætodon capistratus.
Monacanthus aurantiæus.	Holacanthus tricolor.
Syngnathus Jonesii.	Caranx dentex.
Centriscus, sp.	Caranx carangus.
Fistularia serrata.	Caranx chrysos.
Rhomboidichthys lunatus.	Thyrsites prometheus.
Hemirhombus aramaca.	Auxis Rochei.
Lefroyia bermudensis.	Seriola Dumerilii.
Brotula barbata.	Seriola zonata.
Centronotus, sp.	Trachynotus ovatus.
Blennius crinitus.	Coryphæna pelagica.
Gobius soporator.	Coryphæna hippurus.
Scorpæna Plumieri.	Mullus barbatus.
Scarus Catesbyi.	Sargus argenteus.
Pseudoscarus psittacus.	Mesoprion chrysurus.
Pseudoscarus sanctæ-crucis.*	Hæmulon macrostoma.

* [Probably the young of *Pseudoscarus vetula* ; see discussion on page 32, *supra*.]

Hæmulon xanthopterum.
Serranus coronatus.
Rhypticus saponaceus.
Apogon imberbis.
Priacanthus macrophthalmus.
Regalecus gladius.
Belone hians.
Exocæetus lineatus.
Saurus fœtens.

Saurus myops.
Albula conorhynchus.
Ophichthys acuminatus.
Muræna miliaris.
Muræna maculipinnis.
Muræna sanctæ-helenæ.
Acipenser sturio.*
Carcharias obscurus.
Ætobatis narinari.

* [??]

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